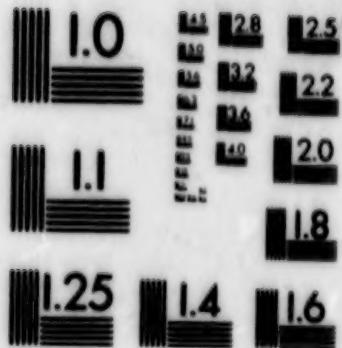


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14 March 1980

# China Report

AGRICULTURE

No. 73

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FOREIGN BROADCAST INFORMATION SERVICE

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14 March 1980

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AGRICULTURE**

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I. GENERAL INFORMATION

CHANGES TO EQUALIZE INDUSTRIAL, AGRICULTURAL PRICES URGED

Beijing GUANGMING RIBAO in Chinese 21 Oct 79 p 2

[Article by Fang Xiao [2455 2556]: "On the Question of Raising Capital"]

[Text] In agricultural modernization, the first priority is the modernization of the means of production, i.e., mechanization, electrification, irrigation and extensive use of chemical fertilizers and other farming chemicals. This will require a great deal of capital. It is estimated that in order to carry out modernization of agriculture in a medium-sized county of 500,000-600,000 inhabitants, an investment of about 400 million yuan is necessary. The more than 2,000 counties in the country will require 800 to 900 billion yuan. It is clearly impossible to raise such a large amount of capital by relying on national investment alone, so it appears that it will be necessary to rely mainly on an accumulation by commune and brigade collectives. In view of the present agricultural situation, it is also pretty difficult to rely on the accumulated capital of the collectives to achieve agricultural modernization. Last year's agricultural commune gross income of over 110 billion yuan was a record. However, after allowing for distribution to commune members, production expenses, taxes and public welfare, the amount available to expand production was only 6 or 7 percent of the gross income. If we rely solely on the accumulated capital of the collective for agricultural modernization, it will take 100 years. If we include the state's annual investment of 5 to 8 billion yuan, then agricultural modernization will take more than 50 years. Since farming communes and brigades not only face the question of increasing production without increasing income, but also the problem of the income of the individual brigade not equaling expenditures, it will be difficult for them to accumulate capital for agricultural modernization.

Some people say that income is not equal to expenditures because of low labor productivity. This is not correct. Part of the expenditures in the "income is not equal to expenditures" are costs (not including compensation to commune members) which are unrelated to low productivity. If the cost of producing agricultural goods continues to be greater than the selling price, then the higher the labor productivity and the higher the investment in means of production, will result in higher losses. American farmer

Hinton operates a farm of 1,600 mu, 1,500 mu of which is planted in corn, with a production of 1,000 catties of corn per mu, or a gross output of 1.5 million catties. His labor productivity is high enough. His income from the corn produced in equivalent RMB is 180,000 yuan and the cost is 100,000 yuan, which leaves a net income of 80,000 yuan. If Hinton's labor productivity, volume of corn production, selling price and investment in the means of production and gross income were unchanged but he used China's means of production, then his farm's costs would climb from 100,000 to 400,000 yuan. Thus, not only would he not make money, but he would owe 220,000 yuan. Although this calculation is neither scientific nor realistic, it should be enough to demonstrate that China's agricultural communes and brigades do not earn enough to cover expenses not primarily because productivity is low, but mainly because the cost of the means of production is too high.

Some people say that commodity prices in a socialist society cannot be compared with those in a capitalist society. It is reasonable for a socialist society to try to stabilize the prices of necessities (including agricultural byproducts) to safeguard the people's standard of living. However, these commodity prices are not stabilized according to the relationship of supply and demand but by deviating from value. Production in a socialist society does not obey objective economic laws. Prices are not directly related to value but to artificially imposed stable prices, and this causes inequality in the people's benefits as well as joy and sorrow. Increasing the scissors differential of industrial and agricultural prices in essence increases the burden on the farmer. In the scissors differential of industrial and agricultural prices, the farmer suffers a dual exaction. Farmers sell their products at prices lower than their value, but they buy industrial products at prices higher than their value, i.e., the means of production and means of livelihood. Farmers receive inflated RMB for the agricultural commodities they sell and buy industrial commodities with deflated RMB. In passing in and out of the farmer's hands, the RMB go through two processes of inflation and deflation; the greater the scissors differential of agricultural prices, the greater the inflation and deflation of the RMB in the farmer's hands. If the increased burden on the farmer of the scissors differential of agricultural and industrial prices does not change, agricultural production cannot develop, not to mention an accumulation of capital for agricultural modernization. This year's large increase in agricultural prices reduced the scissors differential and the burden on the farmer and promoted agricultural development as well.

Some say that the agricultural deficit can be made up by industry. They say that communes and brigades should increase their income and must do a better job in the processing industry. As for the present situation in our agricultural development, this may be said to be the voice of experience. In the majority of advanced models in our country, income is high, the level of mechanization is high, the average cash value of a workpoint is high and there is a great accumulation of capital because processing is

done well. However, our fundamental aim in developing agricultural production and realizing agricultural modernization is to produce more food and agricultural byproducts and to satisfy the needs of the people and of industrial development. Communes and brigades will not be willing to use the profits of processing to make up farming losses, losing the money they have received just to sell more agricultural byproducts. How much less is this the case in improving processing with limited capital, equipment, supply of raw materials and production technology. When it is impossible for every brigade to do a good job, then how will those communes and brigades which cannot do a good job ever develop?

Improving the ability of communes and brigades to accumulate more capital for agricultural modernization must certainly be combined with producing more agricultural byproducts. We should study the economic policies currently in force and how to adjust parity of industrial and agricultural production and parity within agriculture so that prices and values are fundamentally in agreement and so that the development of production and social needs coincide. To this end, I propose the following:

1. We should draw on historical experience and adjust prices in light of the guiding principle: "treasure the five grains, slight gold and jade". In China's history, all feudal dynasties that flourished economically did so because they carried out policies that encouraged agriculture and paid serious attention to resolving the problem of low grain prices hurting agriculture. Over 2,000 years ago Emperor Xiaowen [1321 2429] of the Han Dynasty adopted Chao Cuo's [2513 6934] proposal to "treasure the five grains, slight gold and jade", thus stabilizing the chaotic situation created by Lu Hou's [0712 0683] dictatorship and promoting the prosperity of an already declined economy. Our potential for agricultural production is still very great, but because some economic policy questions have not yet been resolved some people are serving agriculture half-heartedly. It is necessary to introduce a limited control on the movement of the farming population to the cities, but policy limitations must be combined with economic interests so that the people will be happy to serve agriculture and thus the movement of agricultural population to the cities will be effectively controlled. If we rely solely on administrative measures, not only will people not be enthusiastic about agriculture, but they might be provoked to hostility. We must draw on historical experience, adjust prices and give the farmers the economic benefits they deserve so that young people will be happy in agricultural production and turn any negative feelings into positive factors.
2. We should draw on foreign experience and treat agricultural communes and brigades as enterprises. Capitalist countries are market economies and use commodity prices to adjust the proportional relationship of the production departments. In capitalist countries, where the average amount of food and agricultural byproducts per person is greater in accordance with the objective laws of a market economy, the prices of agricultural products are influenced by supply and demand so they should be inclined to be lower.

However, their prices for agricultural products are not lower than in our country and, looked at in terms of the price parities between industrial and agricultural products, their agricultural products are worth more than ours. This is because they treat agriculture as a key enterprise, carry out a policy of price supports, adopt financial subsidies, and guarantee farmers an adequate profit in order to promote development. Our socialist country should guarantee the agricultural brigades an adequate profit so that farm income centered in the collective economy will help to promote the rapid development of the collective economy. Last year the average monthly wage for each agricultural laborer was 16 yuan, a daily wage of 50 cents; on an average, each of the 800 million farmers received only 6 yuan a month from the collective's income for living expenses. If this problem is not conscientiously studied and resolved, it will be difficult to strengthen and develop the collective economy.

Parity within agricultural products also should be adjusted as well as the phenomenon of selling grain rather than raising hogs or selling hay rather than raising cows and sheep to insure the faster development of state-run and collective animal husbandry. Last year, the semimechanized hog farm of the Beichenglin [0554 4453 2651] Brigade of the Wanxinzhuang [8001 2450 8369] commune in the eastern suburbs of Tianjin raised over 2,400 hogs but lost over 14,000 yuan mainly because hog prices are low. China's grain prices are comparable to those of the United States but the difference in meat prices is much greater. In RMB, U.S. beef is 4.20 yuan per catty, but Chinese beef is .75 yuan per catty, a 4.6-fold difference; U.S. pork is 2.40 yuan per catty, but China's is .70 yuan per catty, a 1.6-fold difference. Thus, in the light of foreign experience, parity of agricultural products should be adjusted.

The key to accelerating agricultural development and improving the ability to expand reproduction lies in lowering the prices of the means of production. Because the cost of the means of production is higher than their value, agricultural expenses in China are greater. According to statistics, this year's agricultural expenses will be about 36.5 billion yuan. Supposing we produced based on Japan's means of production: the price ratio of chemical fertilizer in Japan and China is 1:3.5, tractors is 1:2.3. On the basis of an average ratio of 1:3, our agricultural expenses could be reduced to 12 billion yuan, a saving of 24.5 billion yuan over present agricultural expenses which, compared to last year's big increase in agricultural prices, would earn farmers over 7 billion yuan, or a two-fold plus increase. This means that just by lowering the prices of industrial products, we could lower agricultural costs and let the farmers earn more. There are many advantages to gradually lowering the prices of industrial products in line with their value. First of all, it would improve industry's ability to expand reproduction, solving the question of increasing production without increasing income and promoting the development of agricultural production. Secondly, it would make plants improve their management, refine accounting, lower consumption, improve quality and reduce waste. Thus, for our country to reduce the scissors differential of industrial and agricultural prices we should adopt a policy of primarily lowering industrial

prices and secondarily raising agricultural prices. Revenue will temporarily be reduced if industrial prices are lowered, but after agricultural development is accelerated and the farmers' purchasing power is increased, the volume of industrial sales will increase many times over, industrial production will develop by leaps and bounds and national revenue will also increase greatly. There will be but a single cycle. We should resolve to solve this problem. Otherwise, it will be difficult to reverse the stalled advance of our national economy. At the same time, there are many drawbacks in situation in which prices deviate from value. It results in an unreal relationship between sectors of the national economy, overshadows the farmers' contribution, and creates a false image of a high value of industrial production. If farmers are forced to sell their agricultural goods at below value prices and buy industrial goods at above value prices, they feel unequal. If this continues, it will affect the alliance of workers and farmers and lower the prestige of the Party and the government among the farmers. Therefore, China's prices should be uniformly adjusted on the basis of value. In particular, the prices of industrial goods should be uniformly lowered and the parity of industrial and agricultural products should be adjusted. This is already a necessity.

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NATIONAL

URBAN CONSTRUCTION BUREAU ISSUES NOTICE ON TREE PLANTING

OW270914 Beijing XINHUA in English 0830 GMT 27 Feb 80 OW

[Text] Beijing, February 27 (XINHUA)--The State Bureau of Urban Construction has recently issued a notice urging city dwellers in all walks of life across the country to do their utmost in the drive to make cities green.

The notice came on the eve of national tree planting day which falls on March 12.

It says that tree planting and gardening form an integral part of city construction for it is important for socialist modernization and improving living and working conditions.

It notes that in the campaign, quality should be ensured, good strains selected and the species of trees well-proportioned. More evergreen trees and shrubs should be planted.

Along with tree planting, it adds, attention should be given to the cultivation of flowers, grass and other soil covers in the light of specific conditions in each locality.

It calls for implementation of the policy that "he who plants the tree has the right to own it." So trees may be owned by the state, collective or the private citizen if they are planted at their initiatives. The city has the authority to supervise tree felling and replanting and no person or unit has the right to do so at will.

Meanwhile, the headquarters of the general staff, general political department and general logistics department of the people's liberation army have jointly issued a notice calling upon every armyman to plant 20 trees this year, besides helping the local people in this tree planting drive.

CSO: 4020

NATIONAL

HIGHER OUTPUT OF AQUATIC PRODUCTS INDUSTRY FORESEEN

Beijing GONGREN RIBAO in Chinese 27 Sep 79 p 2

[Article by Cong Ziming [0654 1311 2494] of the State Aquatic Products Bureau: "Produce More Aquatic Products for the People"]

[Text] Under the leadership of the Party, China's aquatic products industry has come into being from nothing and has continued to grow. The aquatics products industry has become an important part of the national economy and has made an important contribution to supplying the needs of the people and supporting socialist construction.

Fish and shellfish aquatic products taste good, are high in protein and are a food people like. Aquatic products have always sold well on the international market. A ton of unshelled, once-frozen prawns sells for as much as \$13,000. A ton of qing yu zi [7230 7625 4750] sells for about \$33,000. Aquatic products are one of our country's key exports. The grand total of our fish and shellfish exports from 1966 to 1978 was over 1.1 million tons, which earned over \$1.39 billion.

Since Liberation, China's aquatic products departments have supplied a great quantity of fish for the domestic market. In 1949, the gross output of aquatic products was only 448,000 tons. In 1978, the gross output had reached 4.66 million tons. After the "gang of four" was smashed, many areas and units made significant achievements in developing the production of aquatic products and increasing the people's fish consumption. In Shanghai, for example, the output of aquatic products in 1978 increased 83 percent over 1977, breaking the highest record in history. Wuhan actively developed urban fish raising, and the gross output in 1978 had increased three-fold over 1971. The average amount of fish supplied per capita was increased from the earlier 3 jin 2 ounces to 7 jin 3 ounces, of which fresh fish occupied 43 percent of the fish marketed. People say happily: "A land of fish and rice, and now there is more fish."

China has abundant aquatic resources. The coastline is over 18,000 km long, and there are 430,000 square sea miles of fishing grounds on the continental shelf where the water is less than 200 meters deep. There are 7.4 million mu of shallow sea and flats along the sea which can be used

for aquaculture. Within the country there are 5,000 rivers of various sizes and over 900 lakes and ponds with an aquaculture area of over 75 million mu. China's seagoing motorized fishing fleet has increased from a few dozen boats to over 36,000 with a total of 2.5 million horse-power. In the past few years, the shallow water aquaculture area has been expanded nearly 10-fold, the varieties of fish being bred have increased and urban fish culture has begun to industrialize and use containers built with nets for [4986 4630] raising fish. After it got fully underway in coastal areas, seawater aquaculture has paid attention to and expanded production of mollusks, shellfish, seaweed and abalone. Cold storage of aquatic products has also developed rapidly, and by 1960 the cold storage capacity was already 20 times that of the pre-Liberation period. There are now 163 cold storage warehouses with a capacity of 136,000 tons at one time.

Expansion of research work in aquatic production science and technology is a precondition for developing the aquatic products industry. Aquatic products scientific research units have now increased 119-fold over the pre-Liberation period, and the number of research personnel has increased 84-fold. Aquatic scientists and technicians have made systematic and extensive surveys and studies of China's marine resources and have made some preliminary studies of the important economic fish and shellfish of the coastal areas, their migration, distribution, life habits, and volume of resources. At the same time, they have begun to study artificial aquaculture and have had some successes with artificial propagation of shallow water fish and with artificially raising seedlings in coastal waters, which has earned attention and commendations both at home and abroad. The results of research on 37 scientific aquatic products have been praised and rewarded at national scientific congresses.

Because we lacked experience in aquatic products work and did not know enough about objective laws, and especially because of the disruption and destruction of the ultraleftist line of Lin Biao and the "gang of four," the quantity and quality of our aquatic products cannot satisfy the present demands of our standard of living and socialist construction. For example, some places recklessly reclaimed land from lakes and reduced the water area in which fish breed, and in constructing floodgates and dams, passages for fish and crabs to migrate were cut off and the water was polluted by industrial residue; also, waste gas and sewage has greatly reduced the shallow-water fish production. Due to superficially emphasized high production, overfishing at sea has seriously damaged off-shore resources.

The national aquatics products work conference convened in March of this year, in the spirit of the Third Plenary Session of the 11th Party Central Committee. Upholding the principle of practice as the sole criterion of truth, it summarized the lessons of experience in aquatic production work over the last 30-odd years and developed policies, missions and measures for accelerating the development of aquatic products production, determined to start with adjustment and concentrate efforts in the three tasks of resource protection, aquaculture and maintaining the freshness of processed aquatic products. All regional aquaculture agencies will be revived and

strengthened. Some of the lakes, ponds and mud flats which have been reclaimed in the past have already been restored to lakes and some are already in use in aquaculture. The 10 large commercial fish bases in the nation have now made new advances. This year the area for shellfish culture has been expanded 7.5-fold over last year. We believe that under guidance of the spirit of the Third Plenary Session of the 11th Party Central Committee, having been adjusted and consolidated, China's aquaculture will enjoy great development.

8226  
CSO: 4007

RAPID DEVELOPMENT IN ANIMAL HUSBANDRY EXHORTED

Beijing GONGREN RIBAO in Chinese 27 Sep 79 p 2

[Article by Zheng Xingjie [6774 2502 2638] of the Bureau of Animal Husbandry: "Make a Concerted Effort To Promote the Development of the Animal Husbandry Industry:]

[Text] Before Liberation, animal husbandry was hardly alive. The number of domestic animals and birds was small, and there were many diseases and natural disasters. After the new China was founded, the Party and the state were very concerned about the development of the animal husbandry industry. In 1955, a nation-wide cattle plague was eradicated and many other cattle diseases were thereafter controlled.

West of the arc from Heilongjian to Yunnan is China's grassland animal husbandry area, primarily sheep and cattle, and east of the arc is an agricultural area of combined farming and animal husbandry. China's pasturelands are extensive, and being four times the 1.5 billion mu of arable land, they can provide great amounts of coarse to fine fodder. Grassy hillsides and mountainsides, lake and ocean shores, confined spaces and even bits and pieces of land in cities and around factories can provide fodder resources for animal husbandry. The conditions are excellent, and there is enormous potential.

The number of head of cattle in China is increasing rapidly now. Compared with 1949, hogs have increased four-fold, sheep three-fold, large cattle have increased by 50 percent and fowl, rabbits and bees have also increased greatly. Purchases of hogs, cattle, sheep, fowl, eggs, rabbits, honey and furs and milk in the country have increased greatly and played a positive role in the standard of living and in export trade.

China has promoted and developed some good varieties of animals and birds. In recent years, China has imported some good varieties of domestic animals, including beef and dairy cattle, has carried out purebred reproduction and crossbreeding improvements and has expanded new breeding techniques using frozen semen. In the early Liberation period, the woolen industry had to rely on imports for the fine wool it required, but now we are basically self-sufficient because of the vigorous development of fine wool.

sheep and improved sheep. Fine-wool sheep are being raised for meat and wool in Xinjiang and in Manchuria. China has also developed the Beijing black and white milk cows which produce 5,200 catties of milk per head annually and which are now spread throughout a dozen provinces in the north and are contributing the fresh meat and milk which is urgently needed in urban industrial and mining areas.

Accomplishments in the prevention and treatment of animal diseases are also important. Provinces, regions, counties and communes all have veterinary medicine stations and brigades or production brigades have barefoot veterinarians or hygienists who are engaged in production as a primary prevention network. China has independently and self-reliantly established its own veterinary biomedicine industry system and produces over 100 vaccines, serums and diagnostic chemicals and is more than self-sufficient. Furthermore, China has developed a very effective hog cholera vaccine, which is available to Korea, Romania, Yugoslavia, Vietnam, the Soviet Union, Italy, France, Czechoslovakia and Hungary. China also has some vaccines which have reached or almost reached the level of those in the advanced countries.

The agricultural products processing industry in China's pastoral areas has also begun to develop. In the past the pastoral areas did not have modernized animals products processing industries, but now in many grassland areas and cities many dairy products, wool spinning, leather and meat combined processing plants have been built. Before Liberation, China's dairy products industry had only three plants in the entire country, but now 28 provinces, cities and autonomous regions have built dairy plants. There are over 10 dairy plants in Heilongjiang and Jilin alone. In 1978, the milk powder produced by the Changping [2490 1627] County Dairy Products Plant in Shenxi alone was over 800 tons--over 600 tons more than the gross output of milk powder for the entire country before Liberation.

Although there have been great developments in China's animal and fowl industry, there are still considerable contradictions between supply and demand and quantity and quality. The increase in output of animal products is not fast enough and cannot catch up with the demands of a higher standard of living. The vigorous development of China's animal husbandry is not only a matter for the agricultural and animal husbandry departments, but all firms and enterprises in the country should put forth every effort to promote the high speed development of animal husbandry modernization to provide animal and poultry products as quickly as possible, respond to the demands of a daily improving standard of living and catch up with the advanced production levels of the world's animal husbandry.

8226  
CSO: 4007

NATIONAL

CROPS, ANIMAL PRODUCTION INCREASE ON STATE FARMS

Beijing BEIJING RIBAO in Chinese 23 Dec 79 p 4

[Article: "State Farm Achieved Bumper Harvest Again This Year"]

[Text] Production of grain, cotton, oil crops, and sugar by the state farms achieved a bumper harvest again this year.

According to the reports submitted to the Ministry of Agriculture and Reclamation by various state farms from various parts of the country, the total bean crop production this year has reached more than 13.89 billion jin; cotton, 1.6 million dan; and sugar, 21.85 million dan, surpassing those of last year by 7, 8, and 16 percent, respectively. The area in which oil crop was planted decreased 19 percent as compared with last year, while the total yield reached 1.738 million dan, which was slightly greater than that of last year, amounting to a 24 percent increase in per my yield this year compared with last year. Hogs, sheep, rabbits, fowls, fruits and tea leaf have also increased. The hog production this year was 6.6 percent more than that of last year. The bean crop handed over to the government by the state farms scattered all over the country this year is said to have reached 4.4 billion jin, amounting to 12 percent more than that of last year. Cotton, meat, sugar, tea leaf and fruits delivered to the nation have all increased.

During the course of implementing the spirit of the Third Plenary Session of the 11th Party Central Committee, the state farms all over the country have demonstrated a significant characteristic. They have continued to purge the evils inherited from the extreme leftist roader and to promote security and unity. The leading cadres and the masses are united in heart to do the production construction well. They strived to do things according to the economic laws by adequately expanding the right for independence of every enterprise and practicing financial undertaking. They have even adopted the policy of "three regulations, one award" (regulations concerning production, delivery, and profit; excess profit distributed as award) to further mobilize the enthusiasm of the workers. They have also aggressively grasped a few effective measures for increasing production. The area for planting superior strain was expanded, application of chemical fertilizer and chemical herbicide was increased, and the water and irrigation system was developed in order to improve the conditions favorable to agricultural production.

NATIONAL

'XINHUA' ON METEOROLOGICAL DEVELOPMENT IN MINORITY AREAS

OW210806 Beijing XINHUA in English 0703 GMT 21 Feb 80 OW

[Text] Kunming, February 21 (XINHUA)--The Tibetan people are now using radar and rockets to prevent hailstorms, instead of praying to Buddha or gathering a crowd to shout at the heavens as they used to do two decades ago.

These achievements were pointed out at a national meteorological meeting held here recently.

Most counties and people's communes in the Tibetan Autonomous Region now have weather stations. Hundreds of thousands of copies of TIBETAN METEOROLOGICAL KNOWLEDGE and a meteorological almanac in the Tibetan language are being sold every year in the region.

Since 1973, meteorologists in Tibet have been studying photographs of clouds taken from meteorological satellites, historical data on weather, the climatic effects of maritime winds from the Bay of Bengal.

Achievements in meteorological researches done in other minority nationality areas were also discussed at the meeting.

Most counties and communes in Xinjiang, Inner Mongolian, Ningxia and Cuangxi autonomous regions also have meteorological observatories and stations.

The major goal of weather stations is to serve agriculture. Weather forecasting has a direct bearing on deciding the appropriate time for the planting, sowing and harvesting of crops and for grazing in animal husbandry.

Forecasts and subsequent measures also help avert natural adversities. For example, in the past Baizheng County in Xinjiang often suffered from hailstorms. But since an anti-hail station was set up in 1976, damage from such storms has been greatly minimized.

To educate national minorities about the weather meteorological departments have published pamphlets and picture books and made films combining local popular legend with meteorological knowledge.

NATIONAL

BRIEFS

HENAN YELLOW RIVER HARNESSING RALLY--In the past 30 years, there have not been any serious accidents of flood in the lower stretch of the Yellow River through the efforts of the people in strengthening and heightening the embankment after building 480 million cubic meters of earth and stone work. In the middle stretch, there are now 60,000 square kilometers of irrigated land. In the upper stretch of the river, there are seven large and medium key projects, and 136 large and medium reservoirs with a total capacity of 29,400 million cubic meters capable of generating 2.5 million kilowatts of electricity. The irrigated areas of the Yellow River have been increased from 12 million mu in the early period of the founding of the country to 50 million mu now. The tasks of harnessing the Yellow River in the 1980's are to further consolidate the existing facilities for preventing floods, build complete projects in the lower stretch for preventing flood and irrigation and, strengthen the maintenance of soil in the middle stretch so as to promote the hydroelectric power in the upper stretch. [HK060835 Zhengzhou Henan Provincial Service in Mandarin 1130 GMT 30 Jan 80 HK]

DEFENSE INDUSTRY DEPARTMENTS FARMS--Beijing, 23 Feb--Staff members and workers of plants under the national defense industry departments have set up some 500 farms in the Gobi Desert, and remote mountains and ranges of the country. These farms have produced 50 million jin of grain and 70 million jin of vegetables, thereby lessening the state burden and improving their own living. These plants have also developed agricultural sideline production. [Beijing XINHUA Domestic Service in Chinese 0133 GMT 23 Feb 80 OW]

COTTON ACCELERATOR DEVELOPED--Shanghai, 22 Feb--After years of experiment, Chinese agronomists have developed an ethylene agent to expedite cotton growth and promote its fiber quality. The Agriculture Ministry and concerned scientific and technological research units recently held a conference in Shanghai to exchange experiences on its application. Generally fine results were reported. Agronomists, however, warned against its misuse and stressed that application must be suited to local conditions. [Beijing XINHUA Domestic Service in Chinese 0227 GMT 22 Feb 80 OW]

MANAGING OVERWINTERING CROPS--Beijing, 21 Feb--Commune members in China's vast wheat and rape producing areas are strengthening field management for overwintering crops. As of early February, winter irrigation and manure application have been completed in more than 60 percent of the total acreage

of wheat field in all provinces in the Huanghe River and Huaihe River valleys. After completion of wheat sowing, conferences on wheat production have been held in Hebei, Henan, Shandong and Shanxi provinces. In Hebei, 80 percent of the total wheat acreage have been watered, some 35,000 small-scale water conservancy projects built, some 14,000 wells sunk and irrigated acreage enlarged by some 1.2 million mu. Provinces on the middle and lower reaches of the Changjiang River are also intensifying field management for rape and green manure crops. [Beijing XINHUA Domestic Service in Chinese 0300 GMT 21 Feb 80 OW]

SNOWFALL OVER NORTH, NORTHWEST--Beijing, 25 Feb--According to the Central Meteorological Observatory, snow fell in Beijing and over most areas of north China and the eastern part of northwest China between yesterday afternoon and this morning. The average precipitation was from one to three millimeters, except in Zhangjiakou in Hebei Province and Datong in Shanxi Province where over five millimeters were recorded. Snow is now expected in the northeast. The snowfall has helped winter crop growth in north, northwest and northeast China which have suffered from dry spells since last autumn. [Text] [Beijing XINHUA in English 1225 GMT 25 Feb 80 OW]

CSO: 4020

**ANHUI**

**BRIEFS**

**AGRICULTURAL CAPITAL CONSTRUCTION--Hefei, 19 Feb--Anhui Province**  
has scored marked achievements in agricultural capital construction last winter and this spring. By the end of January, the province's rural areas had completed 140 million cubic meters of earth and stone work and built over 12,000 large-, medium- and small-sized water conservancy projects, approximately half the projects under construction. At the same time, Fuyang and Suxian prefectures had dug over 15,000 meters of rivers and gullies and completed over 16,000 drainage and irrigation projects of various types. Since last November, Luan and Chuxian prefectures have built over 1,800 large- and small-sized reservoirs and ponds. [OW212328 Beijing XINHUA Domestic Service in Chinese 0148 GMT 19 Feb 80 OW]

**ANHUI COMMUNE ENTERPRISES' INCOME--**In 1979 the total income of Anhui Province's commune- and brigade-run enterprises was 1.06 billion yuan, an increase of 18.3 percent over 1978. The average amount of profit per enterprise worker rose from 191 yuan in 1978 to 211 yuan in 1979. By the end of last year, the province allocated 15.75 million yuan to aid 2,261 enterprises, 1,273 of which were newly built ones. [OW230950 Hefei Anhui Provincial Service in Mandarin 1100 GMT 22 Feb 80 OW]

**ANHUI STRENGTHENS FIELD MANAGEMENT--**Anhui is strengthening the field management of overwintering crops. As of early February, the province had applied additional manure to 10 million mu of its 27.79 million mu of wheat fields. It has also applied manure to 5.3 million mu of rape fields. Last fall, Anhui's two major wheat-producing prefectures suffered waterlogging and, later, some 80 days of drought. Wheat sowing was delayed about 15 days. Rain and snow fell throughout the province in mid-December. The Anhui Provincial CCP Committee and the provincial agricultural departments called for strengthening as quickly as possible field management of wheat, rape and other overwintering crops in all places. [OW261008 Hefei Anhui Provincial Service in Mandarin 1100 GMT 25 Feb 80 OW]

ANHUI AFFORESTATION--Since the beginning of last winter, more than 130,000 mu of land have been leveled in Anqing Prefecture, Anhui, in preparation for afforestation. As of now, tea-oil and tung-oil trees have been planted to 7,000 mu of land. (Hefei Anhui Provincial Service in Mandarin 1100 GMT 22 Feb 80 OW]

ANQING COTTON OUTPUT--In Anhui Province, the per-mu output of Anqing Prefecture's 470,000 mu of cotton field reached some 100 jin in 1979. The prefecture established all-time high records on per-mu output and total output of cotton last year. Five of the prefecture's six cotton-growing counties have made preparations and improved farming methods in efforts to increase this year's cotton output by 43,000 dan this year. (Hefei Anhui Provincial Service in Mandarin 1100 GMT 18 Feb 80 OW]

CSO: 4007

FUJIAN

BRIEFS

FUJIAN BACTERIAL FERTILIZER--Fuzhou, 18 Feb--The 250 factories and stations under the supply and marketing departments in Fujian Province are producing No 5406 bacterial fertilizer in large quantities to insure that one-third of the early rice seedlings will get bacterial fertilizer. This is one of the measures adopted by workers of the supply and marketing departments to support the peasants in combating spring chill in order to insure a bumper harvest of spring crops.  
[OW201035 Beijing XINHUA Domestic Service in Chinese 0206 GMT 18 Feb 80 OW]

FUJIAN PREFECTURAL DEVELOPMENT--Fuzhou, 24 Feb--Great changes have taken place in Jinjiang Prefecture, Fujian, in the past 3 years. It is a key native area of Overseas Chinese. There are some 1.8 million Overseas Chinese, who are natives of this prefecture; there are also some 950,000 returned Overseas Chinese and dependents of Overseas Chinese in the prefecture, counting some 20 percent of the prefecture's total population. In the past 3 years, it has completed sinking over 10,000 big wells and building 37 small reservoirs, irrigation ditches totaling 610 km in length, rural roads totaling over 2,300 km and a large number of fields giving high and stable yields irrespective of drought or excessive rain. In 1979, its total grain output reached more than 2 billion jin and the total industrial output value reached over 560 million yuan. [Beijing XINHUA Domestic Service in Chinese 0720 GMT 24 Feb 80 OW]

FUJIAN FARMLAND CONSTRUCTION--Fuzhou, 23 Feb--Pucheng County, Fujian, suffered from drought over past several years. In 1978, 270,000 mu of county's rice fields were drought-effected; another 90,000 mu were stricken in 1979. Total output of grain for the 2 years was reduced by more than 40 million jin. By 1978, there were a total of 2,481 completed water conservancy projects in the county, capable of irrigating 360,000 mu of land. At present, the county also plans to afforest 860,000 mu of hilly areas within 10 years.  
[Beijing XINHUA Domestic Service in Chinese 0701 GMT 23 Feb 80 OW]

SUPPLY AND MARKETING COOPERATIVES--In Fujian Province, 250 bacteria spores factories and stations of the provincial supply and marketing system are producing large amounts of "5406" bacterial fertilizer in an attempt to make this type of fertilizer available to one-third of the early rice seedlings in the province. Experiments proved that this fertilizer, when applied to the soil together with the seeds, can increase the tolerance of rice seedlings to the cold spring weather, raise the germination rate by 8-10 percent and prevent the seedlings from rotting. Moreover, some 800,000 tons of chemical fertilizers for the overwintering and spring crops are already shipped to more than 13,000 supply stations, and 7,500 tons of plastic sheets for protecting seedlings from cold weather are in stock. [Beijing RENMIN RIBAO in Chinese 19 Feb 80 p 1]

CSO: 4007

## GUANGDONG

### RECENT WEATHER CHANGES, EFFECT ON LATE RICE REPORTED

Guangzhou GUANGDONG NONGYE KEXUE [GUANGDONG AGRICULTURAL SCIENCES] in Chinese No 5, 20 Sep 79 pp 40-43

[Article by Tu Yuexian [3205 1878 6343] and Guo Yeheng [6753 2814 5899] of the Agrometeorological Research Division, Guangdong Institute of Meteorological Science: "The Trend of Climatic Changes in Recent Years and Its Influence on Late Rice"]

[Text] Climate is an important natural resource of agriculture. The climate of Guangdong supplies agriculture with rich light, heat and water resources; but due to the remarkable monsoon climate and the frequent outbursts of inclement weather, agricultural high yields and stable yields are affected. Since the 1970's, due to climatic changes, for half a year, our province is exposed to late spring, early autumn chills, and numerous late full typhoons, which gravely affects early and late rice production, especially late rice production. Thus, it is important to enhance scientific research and master the laws of meteorology in order to achieve stable yields and high yields in late rice farming.

#### 1. The Weather and Climatic Characteristics of Late Rice Yield Increases and Decreases

Since liberation, the development of late rice in our province has not been fast at all. Basically, it has undergone the following stages: Continuous years of increasing yields in 1950-1958; continuous years of decreasing yields in 1959-1961; both increasing and decreasing yields each year but maintaining upward tendency in 1962-1969; yield increase basically at a standstill, great yield fluctuations within each year in 1970-1978. Although this kind of phenomena can be attributed to all sorts of factors, the chief reason lies in the influence of inclement climate. Based on analysis of related data, the yield-increase years in the entire province can be roughly summed up into the following three features: First, as cold dew wind and cold damage have little influence, the weather conditions are conducive to the flowering and fruit bearing stages of late rice. Although some years are hit by continuous low temperature the diurnal mean air temperature is still above 20 degrees Centigrade,

the north winds are weak, and the day and night temperature difference is relatively great. Second, the mainland portion of our province is not so affected by typhoons which end early and lean toward the west. Third, while there tends to be more sunlight hours, the rainfall is on the low side, and the weather is dry. The yield-decrease years of the entire province can also be summed into three features: First, cold autumn sets in early; there are numerous late fall typhoons; and there is less sunlight in the late period. Second, owing to the "reversed spring cold," both early rice and late rice seasons are delayed, and there is not enough heat during the late period of late rice. Third, the major coastal rice areas are directly affected by typhoons, which brings down the yield of the entire province.

## 2. The Trend of Climatic Changes in Recent Years and Its Influence on Late Rice Yield

Since the 1970's, late rice crops have repeatedly suffered from cold damage and yield decreases, which had been rarely witnessed in history. The three years of drastic yield decreases were all closely related to the low temperature and typhoon weather occurring in the late period of late rice. Based on the situation caused by the profound climatic influence on food grain production, we divided the climatic development roughly into the 1950's, 1960's and 1970's, and our analysis showed that the climate of the 1970's clearly differed from the preceding 20 years primarily in the following aspects:

- (1) Delayed heavy typhoon periods in our province; the typhoon seasons ended late, and the average number (of typhoons) was relatively large.

In the 1950's, 56 percent of the typhoons throughout the entire year in our province were concentrated in the months of August and September; in June and October, the typhoons only accounted for 9 percent, averaging 12.7 times throughout each year. In the 1960's, the heavy typhoon periods occurred ahead of time, concentrating in July, August and September, while in October, the typhoons accounted for only 7 percent of the whole year. Since the 1970's, the heavy typhoon seasons were delayed, concentrating in August, September and October; in October, the typhoons increased sharply, accounting for 19 percent of the whole year; and in November, there were more typhoons than before; throughout the whole year, the average number of typhoons amounted to 13.9. See Table 1.

In the early period of late crops, typhoons are mostly favorable and not so harmful. But in October and November, just when late rice crops are going through the heading, flowering and maturing stages, typhoons and heavy rainfalls are detrimental to flowering and pollination, and can also cause rice crops to suffer from lodging and shattering, thus gravely affecting pollination, fruit bearing and the resulting yield. Besides, in October, typhoons often coincide with cold dew winds (cold

Table 1. Mean Monthly Frequency Distribution of Typhoons in Guangdong

Month Year	4	5	6	7	8	9	10	11	12	Whole Year
1951-1959	0.2	0.4	1.2	1.7	3.2	3.9	1.2	0.8	0.1	12.7
1960-1969	0.1	0.8	1.3	2.8	3.6	3.3	1.0	0.6	0.1	13.6
1970-1976		0.3	2.0	2.0	2.9	2.9	2.6	1.1	0.1	13.9

damage), and sometimes, although the temperature is not down to the point of danger, due to the strong chilly winds, or even gusts of wind and showers lasting 2-3 consecutive days, flowering and fructification can also be affected, resulting in increased number of empty kernels. If the weather is cold with strong winds and heavy rainfall, it not only causes late rice to suffer from cold damage, but also brings storm and flood disasters, which is even more dangerous to late rice. For example, on October 27, 1970, when typhoon No 13 coincided with the cold dew wind, the whole province came under fierce rainstorms, drowning 800,000 mu of late rice. From October 26 through early November, there were 10 continuous days of low temperature, which affected milking and grain filling, and reduced the yield of the entire province by 9.0 percent. In early and mid-October 1975, Typhoons No 13 and 14 struck the central portion of our province, seriously affecting the heading, flowering and fructification of rice crops. Our field surveys of the production fields of the Agricultural Science in Nanhai County showed the following: (1) During the maturing period, the average shattering rate of rice is 25.4 grains per square meters; (2) In the early yellow ripening period, the affected rice spikes and kernels become black brown (the average blackening ratio is 40 percent), the leaf tips are dried and cracked by the wind, and partial lodging occurs; (3) During the milking period, damaged rice grains amount to 40-55 percent; lodging occurs in most of the plants, and 100 percent of the leaf tips become dry and cracked; (4) In the early filling stage, 100 percent of the rice spikes are damaged; approximately 60-70 percent of the grains per spike turn black brown, and there is partial lodging; (5) During the earring and flowering stages, the rice spikes become totally black brown, gravely affecting fructification; (6) During the ear forming stage, externally, the rice drops do not appear to be seriously affected; although this is followed by normal earring, they are seriously damaged by disease.

Looking at the overall situation of the province, we will find that there is a distinct interrelation between typhoons and late rice yields, i.e. as typhoons increase in the late period, the years of yields increase become correspondingly less; conversely, the yield-increase years become correspondingly more, as shown in Table 2.

Table 2. The Relationship Between Land Invading Typhoons and Late Rice Yield Increases/Decreases in Guangdong  
1960-1978

Number of Typhoons	October			October-November		
	Number of Yield- Increase Years	Number of Yield- Decrease Years	Number of Equal Yield Years	Number of Typhoons	Number of Yield- Increase Years	Number of Yield- Decrease Years
0	5	2	1	0	4	2
1	1	2	5	1	2	2
2	0	2	1	2	0	2

(2) Early Cold Dew Winds, North Winds Tend To Increase in October-November

Taking Guangzhou as an example, the only occasions when strong cold dew winds with diurnal mean air temperature below degrees Centigrade ever erupted in October for 3 or more days were as follows: In the 1950's, they occurred in October 28-31, 1957, approximately once in 10 years; in the 1960's, they erupted in October 26-28, 1960, which was also once in 10 years; in the 1970's, there were 6 occurrences in 9 years, i.e., October 27-31, 1970, October 29-31, 1971, October 26-30, 1973, October 15-17, 1975, October 15-17, 1978 and October 28-31, 1978, which approximated 7 times in 10 years, the earliest being on October 15. Following are the number of days in which the diurnal mean temperature was below 20 degrees over the past years: 14 days in the 1950's; 16 in the 1960's; and 35 days (statistics based on 9 years) in the 1970's. Light cold dew winds occur when the diurnal mean temperature is above 22 degrees Centigrade for 3 or more days; and following are the periods when there was 90 percent guarantee of no cold dew winds: In the 1950's, it was prior to October 9; in the 1960's, prior to October 16; in the 1970's, prior to October 4. As compared with October 15 based on 29 years of statistics from 1950 to 1978, it was 11 days earlier in the 1970's, which shows that in the 1970's, the cold dew winds increased sharply and shifted remarkably toward early eruptions. The cold dew winds gradually became active. This can also be seen from the statistics of Nanhai County's northerly winds in October and November: In 1957-1970, the northerly wind frequencies were 60.6 percent in October, and 76.1 percent in November; in 1971-1976, they were 71.7 percent in October and 76.1 percent in November. Based on measurements, as the cold dew wind sets in, the north wind increases, the temperature drops rapidly, which causes the water absorbing capacity of rice plants to weaken and increases foliage evaporation; as the plants suffer from sudden overlosses of water, the stems and leaves become withered and yellow early, thus resulting in decreased yields.

### (3) Serious Cold Damage Poses Great Danger

In Guangzhou, the index for cold damage in the rice milking stage is when the diurnal mean temperature is below or equal to 18 degrees Centigrade for 3 or more days from October 1 through November 20. This occurred 7 times in the 1950's, which amounted to approximately 7 times in 10 years; 3 times in the 1960's, approximately 3 times in 10 years; 8 times in 9 years in the 1970's, which was approximately 9 times in 10 years. Following are the number of days in which the diurnal mean air temperature was below or equal to 18 degrees Centigrade during October 1 to November 10: 43 days in the 1950's, averaging 4.3 days per annum; 24 days in the 1960's, averaging 2.4 days per year; 58 days in the 1970's, averaging 6.5 days annually.

Looking into the general trend, we find that in the 1950's, the cold dew winds and cold damage were slightly heavy, occurring slightly ahead of time; in the 1960's, the cold dew winds and cold damages were relatively light, and delayed as well; in the 1970's, the cold dew winds and cold damages increased remarkably. The low temperatures and cold damages which occurred in mid-November 1978 and late October 1978 were unprecedented in the post liberation period, and the rice damage was also unprecedented under past normal seasonal conditions. In 1976, the delay in early and late rice transplantation was mainly due to the cold spring season that year; by early and mid-November, most of the late rice crops were still in the milking and ripening stages, and when the severe cold weather set in, the rice plants were affected by the cold and withered, thus gravely affecting the fructification rate and 1000 grain weight. The entire province suffered a further decrease of 11.8 percent over the decreased yield of the preceding year. In mid-October 1978, the strong cold dew wind and typhoon coincided; in late October there was again record-breaking low temperature weather, preventing the seedlings of cereal crops from ripening normally, and the entire province suffered a 13.5 percent yield decrease. This was one of the most important weather processes leading to extensive yield decrease throughout the entire province.

### (4) Late Warm Spring, Early Chilly Autumn, Effective Growth Season Shortened

Since the 1970's, owing to the delayed periods between the time when the weather began to warm up in spring to the time when rice crops could vigorously grow, such as the continuous chilly weather in 1976, 1978 and 1979, there have been extensive delays in the transplantation season throughout the entire province, which had been rarely seen over the past 20 years. Examination of the accumulative temperature revealed that over the past years, the total accumulative temperature in Nanhai County from March through November varied from 6700 to 6900 degrees Centigrade in the 1950's to early 1960's; from the mid 1960's to the 1970's, the

variation occurred within the range of 6550-6750 degrees Centigrade, which was 150 degrees Centigrade lower. Particularly in 1976, it was only 6470 degrees Centigrade. The decreased heat and shortened seasons caused the contradictions in the late growth period of late rice to build up and sharpen and gave rise to great fluctuations in late rice yields.

#### (5) Less Sunshine, More Rainfall and Rain Days

Taking Hainan County as an example, in March of 1957, 1970, 1975, 1978 and 1979 respectively, there were over 20 continuous days of long cloudy days with no sunshine at all, and 4 out of 5 times occurred in the 1970's. Also, during the middle and late periods of late rice, there was evident reduction of sunshine: From 1957 through 1969, the average sunshine hours in October totalled 224, and 189 in November; from 1970 through 1977, the average sunshine hours totalled 178 in October and 176 in November, which was 10-50 hours less. Moreover, comparative analysis of the October rain days in the 1970's revealed an increase of 2.4 days over 14 years ago, and the rainfall increased 49.2 mm, as shown in Table 3.

Table 3. Comparison Between Related Meteorological Factors in Various Years

Location: Hainan County

Factor Year (average)	Sunshine Hours (hour)			October		Active Accumulative Temperature (degrees Centigrade) Above 10 Degrees	
	Sept	Oct	Nov	Rainfall	Rainday	Mar - Nov	Aug - Nov
1957-1969	207.1	223.7	188.7	63.9	6.4	3968.4	1761.4
1970-1977	186.1	178.1	176.3	113.1	8.8	3928.2	1733.1
Relatively poor	-21.0	-45.6	-12.4	49.2	2.4	-40.2	-28.3

In sum, the series of climatic changes in the 1970's have brought serious damage to agricultural production. It is chiefly attributed to the systematic influence of the atmospheric circulation formed by the cold high pressure in the north, and the maritime hot low pressure. The combined effects of the delayed heavy typhoon period, the late termination of the typhoon season, the early eruption of cold dew winds, and the active trend have caused the wet cold dew winds formed by autumn typhoons and cold dew winds to increase; thus, there tends to be less sunshine coupled with increased rainfall and rain days, as well as decreased accumulative

temperature and serious disease and insect pest damage, which have gravely affected agricultural production. The climatic changes concern the problem of how to plan agriculture, and which major technical measures ought to be adopted. To understand the trend of climatic changes and its influence on agriculture is conducive to purposefully organizing production in accordance with the laws of climatic changes, and thus minimize the unnecessary damage and losses that may occur in our all-out efforts to prevent inclement weather disasters.

### 3. Promote Favorable Trend and Prevent Damage, Realize Late Rice Stable Yields and High Yields

The damage inflicted on late rice crops by natural calamities are rather complex. Practice has shown that it is not possible to achieve clear results by relying on one kind of measure. Thus, it is especially important to stress combined preventive measures.

At present, there are two ways of taking precautions against natural calamities, i.e., to "avoid" and "resist." To "avoid" means to make full use of the climatic resources in various regions; select early ripening high yield varieties and rotate with other suitable crops; use technical measures or chemicals to promote early ripening, and move the flowering stage of late rice to an earlier or later date so as to avoid calamity. To "resist" means to conduct research on the resist-calamity mechanism of late rice so as to select varieties that have strong resistance against calamities and persist in taking measures to prevent and fight against calamities, as well as intensive cultivation, or use chemical and physical methods to temporarily change the physiological state or ecological conditions of rice plants in order to enhance the anti-calamity capacity of rice. In sum, there are several ways as follows:

- (1) Selectively breed high-yield varieties that are resistant to cold weather and ripen early. It is imperative to examine existing varieties so as to determine which ones are resistant to cold, and try to find cold-resistant early-ripening high-yield varieties as soon as possible.
- (2) Master the laws of climatic changes, and avoid calamities that are impossible to resist for the present. The general principles are: Concentrate on avoiding the cold weather in the northern region; stress avoiding typhoons in the southern area (south of Leizhou Peninsula); and emphasize resisting typhoons and avoiding cold weather in the central region. All areas should combine avoiding, resisting and preventing. Thus, it is advisable to use the safe full heading and milking stage as a limit for planning early and late rice production; all technical measures should be carried within the safe bounds of full heading and milking conditions. In the northern region, full heading should be prior to September 25; in the central north region, full heading should

be prior to October 1; in the central region, full heading should be prior to October 10; in the southern and coastal areas, full heading should be prior to October 15. In order to insure that late rice crops ripen during the safe full heading period, it is necessary to appropriately select early ripening varieties and fanqiu [5064 4428] varieties.

(3) Enhance the resist-calamity capacity of plants--under current circumstances, it is difficult to completely avoid natural calamities. One of the main ways is to enhance the physiological mechanism within the rice crops so as to improve their resist-calamity capacity. Strong and healthy plants with flat leaves, sturdy bodies, and deep and extensive root systems can effectively resist typhoons and the cold weather. Thus, it is imperative to attach great importance to the construction of high yield and stable yield farmland, strengthen soil fertility for rich harvest production, and reinforce hydraulic engineering construction work which combines flood drainage with water-logging prevention. Work solidly on such basic measures as improving soil fertility, cultivating strong seedlings, as well as the improvement, purification and rejuvenation of varieties. Measures should be taken to improve cultivating techniques from sowing to harvesting. Besides, wherever the temperature is low, it is common to drain in the daytime and irrigate at night, raise the level of water, and raise the temperature between the fields, which can cut down the cold damage caused by the low temperature. By applying certain kinds of chemicals to shift the flowering stage of rice crops to before or after the occurrence of inclement weather, it is possible to avoid the damage caused by inclement weather. After the occurrence of inclement weather, apply topdressing outside the roots to change the plants' physiological state; or prior to the occurrence of low temperature weather, spray thermal insulating agents on the surface of leaves and soil to raise the temperature of the fields and plant bodies. According to experiments recently conducted in various places, such measures are effective for reducing cold damage.

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## GUANGDONG

### GUANGDONG MEASURES AGAINST LOW-TEMPERATURE DAMAGE TO LATE RICE DESCRIBED

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[Article by He Dazhang [0149 2192 4545] and Huang Tongwei [7806 0681 1983]:  
"A Climatological Analysis of Cold, Rain and Wind Damage to Late Rice in  
Guangdong and Views On Preventing It"]

[Text] Since the founding of the state, Guangdong's yield per mu and total output of paddy rice have both increased, but it has not been possible to solve completely the problems of low or variable production, particularly because the growing rate of late rice is far slower than that of the early rice. According to statistics for the 29-year period from 1950 to 1978, the average yield per mu of rice paddy for the entire province has increased by 1.2 times, with early rice up by 1.6 times and late rice only doubling. This year there is again great unevenness, and cases where the yield of late rice is lower than that of early rice. In 1976 the yield per mu for late rice was 25 percent below that for early rice and total output 17 percent lower, an unprecedented circumstance. In 1970, 1974, 1975 and 1978 the yield per mu of late rice was also lower than that of early rice, with the difference ranging from 30 to 60 jin. In the 1970's, there have been numerous instances in which late rice has shown major drops in yield or rate of increase of yield, which was not the case in the 1950's and 1960's. The reasons for the declining yields of late rice are quite numerous, but as far as natural conditions are concerned, cold temperature damage by the Cold Dew Wind is the primary factor other than typhoons. Accordingly, it is of considerable importance for achievement of high and steady yields of late rice in this province to make a systematic analysis of the climatology of the Cold Dew Wind so as to understand the patterns of its occurrence.

#### 1. Climatological Criteria Characterizing the Cold Dew Wind

The agricultural climatic criteria of the Cold Dew Wind vary in accordance with meteorological factors, local climate, rice variety, phenological phase and cultivation technique. Accordingly, when investigating a locality's climatic possibilities, types of harmful weather conditions and protective measures taken, as well as relevant aspects of the climate, the abovementioned factors must be taken into consideration.

The late rice season comes at a time when high temperatures give way to low temperatures, and the Cold Dew Wind results from the arrival of cold air; if the cold air is intermittent (interspersed with warmer periods) the rice may be able to get through the flowering period without harm, but if the cold is frequent and intense, with long duration and no warm periods, the probability that the rice will be harmed is much greater. Under these conditions, the later the flowering stage the greater the danger, and not only the flowering stage will be harmed but the boot stage as well, and as a result damage in the milk stage will also be greater. In the boot stage, particularly when the pollen mother cells are undergoing meiosis, the effect on the rate of fruiting is even more serious than at the flowering stage, and even if there is good weather in the flowering period following this damage the rate of fruiting will still be low. During the various parts of the flowering stage, the damage by the Cold Dew Wind is most evident. The empty grain rate reaches 30-40 percent or higher during heading and flowering, while it is 10-15 percent when the cold occurs after the milk stage and over 20 percent when it occurs at the very beginning of heading and flowering.

Because of the geographic position of our province, Cold Dew Wind weather can be broadly divided into two types: dry cold and moist cold. The dry cold type is characterized by cold, dryness, strong winds and a large difference between daytime and nighttime temperatures; the moist cold type is characterized by cold, copious rains or cloudy and rainy weather, little sunshine, and also strong winds. Typical dry Cold Dew Winds occurred in 1954 and 1955, and typical moist Cold Dew Winds in 1970 and 1973-1976. Prior to the 1970's, the dry Cold Dew Wind was most frequent, while in the 1970's the moist Cold Dew Wind has increased in frequency. The moist Cold Dew Wind is the more difficult to guard against and accordingly produces the greater harm. Generally the dry Cold Dew Wind does not result in a marked decrease in yield (e.g. 1971), while the moist Cold Dew Wind almost invariably does; the abovementioned cases where late rice yields were lower than early rice yields are all cases in point.

Analysis indicates that the main cause of harm to paddy rice from both the moist and the dry cold is the low temperature, while other aspects such as dryness and winds are merely aggravating factors. The criteria of harmful cold and overall harmful conditions determined for various localities differ. Accordingly analysis should take account of the various local criteria. At present the most widely held view is that the meteorological criterion of a damaging moist Cold Dew Wind is an average daily temperature of 22-23° C, while for the dry Cold Dew Wind it is a daily minimum temperature of 15-17° C; because previous evidence primarily applies to the moist Cold Dew Wind, the average daily temperature is most commonly used as an indicator. Generally three days' continuous average air temperatures below 22-23° C is taken as the criterion for the Cold Dew Wind. Lower temperatures (generally below 18-20° C), and the longer duration (generally exceeding 7 days) generally rank it as a strong Cold Dew Wind.

As everyone knows, different rice varieties which have different cold resistance and different phenological phases are harmed by the cold differently. For hybrids and fine varieties and non-cold resistant early xian rice which are of the Fanqiu [5064 4828, lit. turning autumn] varieties, the criterion is an average daily temperature below 23° C, while for the typical late xian varieties and relatively cold-resistant early xian which are of the Fanqiu varieties it is an average daily temperature below 22° C; for the more cold-resistant late xian varieties which mature late the criterion is a temperature below 21° C. Geng paddy rice has a greater cold resistance than the xian type, and the criterion may be lowered about 2° C to 20° C or below, while for the most cold-resistant geng rice it can be set at 18° C. In addition, we can estimate that the cold damage threshold at the milk stage is three continuous days of average daily temperatures below 18° C.

Table 1. Frequency of Onset of Cold Dew Wind in Northern Guangdong in 1951-1978 and Corresponding Late Rice Growth Stages

月 份 a		9				10				
日 期 b		11—15	16—20	21—25	26—30	1—5	6—10	11—15	16—20	21—25
寒 露 风 初 日 c	年 数 d	6	3	8	4	3	2	0	1	1
	各 占 % e	21	11	29	14	11	7		4	4
	累 计 % f	21	32	61	75	86	93		96	100
生 育 期 g	早 熟 种 h	幼 k	减 l	减 l	抽 m	灌 n	灌 n	灌 n	灌 n	
	中 熟 种 i		幼 k	幼 k	减 l	减 l	抽 m	灌 n	灌 n	
	迟 熟 种 j		幼 k	幼 k	幼 k	减 l	减 m	抽 m	灌 n	

\*晚稻生育期略字：幼——幼穗分化期

抽——抽穗扬花期

减——减数分裂期

灌——灌浆乳熟期

#### Key:

- |                                  |                                  |
|----------------------------------|----------------------------------|
| a. Month                         | h. Early-maturing varieties      |
| b. Days                          | i. Medium-maturing varieties     |
| c. Day of onset of Cold Dew Wind | j. Late-maturing varieties       |
| d. Number of years               | k. Young panicle differentiation |
| e. Percentage                    | l. Meiosis                       |
| f. Cumulative percentage         | m. Heading                       |
| g. Growth stage                  | n. Milky stage                   |

#### 2. Climatic Characteristics of the Cold Dew Wind

The Cold Dew Wind is an atmospheric structure that occurs as fall passes into winter when the East Asian high pressure ridge moves south, the north-easterly seasonal winds set in, and cold air enters South China. Even though the situation is complicated by relatively large variations from

year to year as to the time of onset of the equinoctial wind and its strength and by autumn typhoons, the agricultural seasons, pairings of varieties, phenological stages and topographical effects, the appearance of the Cold Dew Wind still follows a pattern. Currently for much of our province, both north and south, the heading and flowering season of late paddy rice is roughly: the last 10 days of September for early-maturing varieties, the first 10 days of October for intermediate-ripening varieties, and the middle 10 days of October for late-ripening varieties. In individual years when the timing of its cultivation is delayed the flowering stage may be 3-5 days late. If we take the flowering date of intermediate to late-ripening rice as 15 October, then young panicle differentiation occurs on about 15 September and meiosis about 3 October, just at the time when the equinoctial winds appear and intensify. Table 1 shows the cumulative frequency of appearance and relative frequency of date of onset of the Cold Dew Wind in northern Guangdong Province between 1951 and 1978. The figures for the [Autumnal Equinox about 23 September] and Cold Dew [about 8 October] solar periods are respectively 75 and 93 percent, so that there is already a pattern that the Cold Dew Wind shows up in the Cold Dew solar period. The later the heading and flowering stages of late rice are delayed, the greater the possibility of harm during the reproductive and growth stages.

In the last 30 years, 1954, 1955, 1959 and 1971 were years in which the Cold Dew Wind was severe throughout the province, and of the dry cold type. Years in which it was moderate and of short duration but in which, because of coincidence with the typhoon (especially in the middle 10 days of October) the effect was intensified, included 1957, 1970, 1973, 1974, 1975, 1976 and 1978, and was of the moist cold type. Starting in the middle 1960's, the Cold Dew Wind has been starting rather early. Since the beginning of the 1970's the moist cold type has increased in frequency and severity. This is because of the combination of cold air and the typhoon in recent years.

Provincewide, in the last 28 years (1951-1978) the Cold Dew Wind has appeared between the middle 10 days of September and the end of October a total of 79 times (an average of 2.8 times a year). In the same period typhoons have come in over the land and had an effect a total of 104 times (an average of 3.7 times a year, with 8 occurrences in 1964 and 7 in 1973). Of the 79 occurrences of the Cold Dew Wind, it coincided with the typhoon 59 times (an average of 2 times a year), or in more than half of the cases. Figuring by decade, there were 17 times in the 1950's, 19 times in the 1960's (including 5 times in 1964) and 23 times in the first 8 years of the 1970's (including 5 times in 1973). When the moist Cold Dew Wind has appeared under these conditions, not only has the wind been stronger but it has been accompanied by heavy rains and thunderstorms or continuous cloudy and rainy weather with little sunshine. According to statistics the region experiencing strong winds or violent rain extended over 10 counties twice in two years [twice for wind, twice for rain] during the 1950's, while in the 1960's strong winds occurred 8 times in 5 years

and violent rain 5 times in 3 years, and in the first 8 years of the 1970's strong winds have occurred 12 times in 7 years and violent rains 8 times in 7 years (with only 1972 being an exception). It can be seen that strong winds, violent rains and lack of sunshine have been most severe in the seventies. The most striking example came in the middle 10 days of October 1974, under the influence of typhoon No 22, when 50 county stations were in the typhoon area and 43 were in areas of violent rain. In 1970, 1975 and 1976 wind and rain covered nearly 30 or more than 30. In terms of total sunshine and total solar radiation, October of 1970, 1974, 1975, 1976 and 1978 had low values, and these years without exception produced low yields.

The geographical distribution of the Cold Dew Wind and its severity show a clear pattern in this province, which can be divided into five areas with intensity decreasing southward:

1. The severe Cold Dew Wind region in the mountainous regions of northern and northwestern Guangdong Province. This includes Lianshan, Liannan, Lianxian, Lechang, Renhua, Nanxiong, Shixing, Qujiang, Wengyuan, Lianping, Heping, Longchuan, Pingyuan and Jiaoling counties, as well as the northern parts of Yangshan, Ruyuan, Xinfeng, Heyuan and Xingning counties. Cold damage is predominant, and every year there is a strong Cold Dew Wind which appears early, brings low air temperature, lasts for a long time, occurs on a large number of days, and produces serious damage.
2. The medium-severity Cold Dew Wind region in the mountains and hills of northern Guangdong and southeastern Guangdong. This includes Huaiji, Fengkai, Deqing, Guangning, Sihui, Yingde, Fogang, Longmen, Zijin, Wuhua, Meixian, Dapu and Jiexi counties, the southern parts of Yangshan, Ruyuan, Xinfeng, Heyuan and Xingning counties and the northern parts of Qingyuan, Conghua, Boluo, Lufeng, Puning and Fengshun counties; cold damage is predominant with a small incidence of additional typhoon damage. The Cold Dew Wind appears every year and in most cases is strong.
3. The ordinary Cold Dew Wind region, consisting of the foothills and plains of the central part of the province. This includes the counties of the area south of the previous one down to a line between Gaozhou and the Yangjiang River as well as the Wuzhi mountainous area of Hainan Island. Generally both cold damage and typhoon damage are important, with the Cold Dew Wind appearing in the majority of years and a strong Cold Dew Wind in a small number of years.
4. The mild Cold Dew Wind region of west Guangdong and northern Hainan Island. This includes Zhanjiang Prefecture with the exception of Yangchun, Yangjiang and Xinyi counties and the northern part of Gaozhou County, together with all of Hainan Island except the Wuzhi mountainous area, Lingshui and Yaixian counties and the southern part of Ledong County. There is no extensive cold damage, but typhoon damage occurs, and in some years the Cold Dew Wind occurs, though a strong Cold Dew Wind is generally absent.

5. Southern Hainan Island, where the Cold Dew Wind is absent. This is primarily Lingshui and Aixian counties.

The Cold Dew Wind criteria of these regions are given in Table 2 for reference.

Table 2. Characteristics of Cold Dew Wind by Area

分 区 a	1	2	3	4	5								
站 名 b	连县 c	韶关 d	连平 e	广宁 f	阳山 g	梅县 h	信宜 i	广州 j	汕头 k	湛江 l	湛江 m	海口 n	琼中 o
平均日数 p	26	20	25	19	16	15	10	10	14	9	5	8	14
无出现年数 q	0	0	0	0	0	0	0	0	1	2	9	13	1
初 十 年 八 遇 r	5/10	11/10	7/10	14/10	14/10	15/10	19/10	22/10	22/10	24/10	4/11	10/11	21/10
最 早 s	12/0	20/0	12/0	15/0	18/0	17/0	24/0	22/0	23/0	27/0	20/0	30/0	16/0
日 u 年 份 t	1967	1971	1967	1967	1966	1966	1957	1976	1967	1976	1970	1970	1967
最长天数 v	28	25	29	21	23	17	12	14	24	12	9	11	25
年 份 w	1971	1973	1956 1959	1971	1953	1956 1959	1959	1968	1955	1953 1958	1951 1968	1968	1959
资料年份 x	1952 /	1951 /	1952 /	1956 /	1952 /	1952 /	1954 /	1951 /	1951 /	1952 /	1951 /	1951 /	1958 /
	1978	1978	1978	1978	1978	1978	1978	1978	1978	1978	1978	1978	1978

Key:

- |                 |                           |
|-----------------|---------------------------|
| a. Area         | m. Zhanjiang              |
| b. Station name | n. Haikou                 |
| c. Lianxian     | o. Qiongzong              |
| d. Shaoguan     | p. Average number of days |
| e. Lianping     | q. Number of years absent |
| f. Guangning    | r. Eight years out of 10  |
| g. Heyuan       | s. Earliest               |
| h. Meixian      | t. Year                   |
| i. Xinyi        | u. Starting date          |
| j. Guangzhou    | v. Longest series of days |
| k. Shantou      | w. Year                   |
| l. Yangjiang    | x. Data from years        |

It should also be pointed out that because of different distances from the sea and different topography, latitude and altitude, northern Guangdong has the severe dry Cold Dew Wind. The danger from low temperatures here is greater than that from high winds and heavy rains (flooding). Owing to the complex topography, made up of mountain ranges, valleys and basins, the land features can block out the wind and lessen damage from it, or cols and valleys may intensify the wind force. The southern part more frequently has the moist Cold Dew Wind and is more endangered by thunderstorms (flooding), cloudy, rainy weather or high winds than by low temperatures. Along the seacoast and on Hainan Island the degree of danger is determined by typhoons as well.

### 3. Protection Against the Cold Dew Wind

Protection against the Cold Dew Wind should be a comprehensive program combining "avoidance" and "resistance" measures suited to the locality. Experience shows that, provided understanding of weather patterns is improved so as to deal with them properly and active protective measures are taken, it is possible to achieve steady high yields of late rice. Currently "avoidance" measures are the primary ones; the key is an effective combination of plant varieties and timing of the growing season which makes it possible for the heading and flowering of late rice to avoid or be less susceptible to the effects of the Cold Dew Wind. "Resistance" entails high-yield production techniques and improving the resistance of late rice to flooding, wind, disease and cold, as well as suitable protective measures to be taken at the time the Cold Dew Wind begins.

#### a. Determining the Safe Full Heading Stage and Suitable Planting Time For Late Rice

First we analyze autumnal equinox temperature changes which are common throughout our province. Table 3 shows the average air temperature for various local climatic conditions.

In northern Guangdong the temperature drop comes early and is sizeable. At Shaoguan [7300 7070] the average air temperature falls below 23-22° C during the first or second five-day period of October about 1 year in 4, and by the fifth five-day period of October 8 years in 10; the average temperature falls from 23-22° C down to 18° C in just about a month. An average air temperature below 18° C or a minimum temperature below 10° C (the lower temperature limit for the milk stage) during the sixth five-day period of October occurs about 1 year in 5 and during the fourth and fifth five-day period of November about 8 years in 10. In central Guangdong and further south, the temperature drop is slower and not as extreme. In Canton the average air temperature falls below 23-22° C in the fourth five-day period of October about 1 year in 4, and in the first or second five-day period of November about 8 years in 10; the temperature takes about a month to drop from 23-22° C down to 18° C; the average temperature is below 18° C or the minimum temperature below 10° C in the third or fourth five-day period of November about 1 year in 4, whereas it reaches this level at a later time 5, 6 or more years out of 10. In production work it is generally considered that from full heading to ripening takes 30-35 days, but in fact it takes just about a month, so that the late rice season is rather tight and the amount of warmth is barely satisfactory; if unusually low temperatures or early cold are encountered and the production season happens to have been delayed (as in 1976 and 1978) serious losses will result. An analysis of autumn temperature changes shows that production arrangements must be made in terms of the critical dates, and if planting is late, even well-chosen measures are unlikely to result in high production. Since a high yield of late rice depends on stable production, it is absolutely necessary that the planting be early enough. The Cold Dew and Frost's Descent [about 23 October] solar periods can be considered the danger period for

heading and flowering of late rice in northern and central Guangdong (generally equivalent to the period in which the Cold Dew Wind appears 8 years out of 10), so that the safe full heading stage has to come before this danger.

Table 3. Average Air Temperature by Five-Day Periods by Locality ( $^{\circ}\text{C}$ )

站名 c	月 b	9	10						11					
			1	2	3	4	5	6	1	2	3	4	5	6
d 連山		23.1	22.3	21.7	20.8	19.2	19.0	17.8	17.8	16.7	14.9	14.2	13.9	11.9
e 連昌			23.4	22.6	21.7	20.1	19.6	18.7	18.3	17.8	16.7	15.1	13.7	12.6
f 美				23.7	22.8	21.5	20.7	19.9	19.6	19.0	17.0	16.3	14.7	14.0
g 茂					23.2	21.2	21.4	19.8	19.8	19.5	17.3	16.4	15.9	14.8
h 广州						23.3	22.7	21.9	21.6	21.4	19.7	19.0	17.8	17.0
i 潘江							23.4	22.6	22.8	22.4	20.4	20.0	19.5	18.1
j 蔡江								23.3	23.0	22.9	21.3	20.4	19.3	18.5
k 海口									23.5	22.3	20.6	20.6	20.0	

Key:

- |                    |              |
|--------------------|--------------|
| a. Month           | g. Yingde    |
| b. Five-day period | h. Guangzhou |
| c. Station         | i. Lianjiang |
| d. Lianshan        | j. Zhanjiang |
| e. Lianxian        | k. Haikou    |
| f. Shaoguan        |              |

Next if we analyze the nature of the onset of the Cold Dew Wind in terms of ten-day periods or five-day periods, and the frequency with which the Cold Dew Wind appears within them (see Table 4), given a requirement of 80-percent confidence for production, the heading and flowering periods of late rice in northern Guangdong should be set at the middle 10 days of September, the last 10 days of September in eastern Guangdong and the first 10 days of October in the central and southern parts.

The periods for safe full heading of late rice can be divided into two classes: 1) the main safe full heading period, which is defined as that in which the Cold Dew Wind does not occur 8 years out of 10, and which actually ends on the day before the first day on which the Cold Dew Wind appears 2 years out of 10; and 2) the relatively safe full heading period, which is that in which the Cold Dew Wind does not occur 5 or 6 years out of 10, and which ends the day before the average date of onset of the Cold Dew Wind (see Table 2). From Table 5 it can be seen that the end of the main safe period is about 7 days earlier than the relatively safe period and that the end of the relatively safe period is about 7 days earlier

Table 4. Frequency of Appearance of Cold Dew Wind by 10-Day and 5-Day Periods (%)

站名 <sup>f</sup>	(顺序) <sup>b</sup>	月 <sup>a</sup>		9		10		9		10							
		中 <sup>c</sup>	F <sub>d</sub>	上 <sup>e</sup>	中 <sup>c</sup>	F <sub>d</sub>	上 <sup>e</sup>	3	4	5	6	1	2	3	4	5	6
g. 遂昌	14	56	81	96	100			7	7	33	37	48	60	74	85	89	93
h. 梅州		32	61	89	100					15	29	36	39	64	79	85	96
i. 梅县	7	15	37	89	96			7	7	7	30	20	48	63	70	89	
j. 汕头		11	29	79	96			4	7	11	25	25	64	75	85		
k. 广州		11	18	54	93			4	7	4	11	25	43	57	75		
l. 阳江		7	7	44	85					7	0	7	15	37	52	63	
m. 肇庆		4	4	36	54					4	4	0	18	25	26	43	

Key:

- a. Month
- b. Ten-day (or 5-day) period
- c. Middle 10-day period
- d. Last 10-day period
- e. First 10-day period
- f. Name of station
- g. Lianxian
- h. Shaoguan
- i. Meixian
- j. Shantou
- k. Guangzhou
- l. Yangjiang
- m. Zhanjiang

than the danger date (namely the day of arrival of the wind 8 years out of 10; see Table 2). Once we have determined the safe full heading period, the different varieties' growth periods can be used to determine the proper transplanting time (or the requirements for raising strong seedlings can be used to determine the proper sowing date); each locality's proper transplanting period can be determined with the following formula:

$$D_x = D_w - V_m$$

where  $D_x$  is the transplanting date,  $D_w$  is the safe full heading date for that location, and  $V_m$  is the number of days required for the variety in question to reach the heading stage after planting in the locality in question. For Canton, as example, the safe full heading date is 7 October, and if a intermediate-maturing variety will reach the heading stage 60 days after transplanting, the transplanting date should be in the first 10 days of August. Experience indicates that planting before the Autumn Begins solar period [about 7 August] gives higher yields than planting after the autumnal equinox, so that in general we can assume that the transplanting dates for the various regions are as follows: in the northern section, transplanting should be finished by 5 August; in the central and southern sections it should be finished by 10 August; and in the hilly regions of the Dongjiang [East River] and Xijiang [West River] rivers in the central section it should be finished by 5 August.

As to the sowing date, because of the requirements that old and vigorous seedlings should be used for light-sensitive late-maturing varieties and vigorous seedlings of the proper age for temperature-sensitive, early-maturing and "fanqiu" varieties, a typical late crop of an intermediate- or late-maturing variety should be sown about the Grain in Ear solar period [about 6 June], or 20 June at the latest; highly temperature-sensitive varieties should be sown between the end of June and the first 10 days of July.

Table 5. Safe Full Heading and Relatively Safe Planting Dates for Local Climates (Day/Month)

a 地区次序	1	2	3	4								
b 站名	c 連昌	d 韶关	e 連平	f 梅昌	g 汕头	h 广州	i 高要	j 信宜	k 阳光	l 肇江	m 海口	n 萍乡
o 基本安全齐穗期	21/8	27/8	28/8	29/8	4/10	7/10	8/10	9/10	14/10	16/10	20/10	28/8
p 相对安全齐穗期	28/8	4/10	29/8	6/10	11/10	14/10	14/10	14/10	19/10	24/10	30/10	9/10
q 适宜插秧期*	22/7	28/7	24/7	30/7	5/8	8/8	9/8	10/8	15/8	16/8	21/8	29/7

\*以基本安全期为准，并按  $V_m = 60$  天计算。在安全齐穗前提下，尽量考虑能延长栽培本田生长期计算。

Key:

- |                 |                                      |
|-----------------|--------------------------------------|
| a. Area number  | j. Xinyi                             |
| b. Station name | k. Yangguang                         |
| c. Lianxian     | l. Zhanjiang                         |
| d. Shaoguan     | m. Haikou                            |
| e. Lianping     | n. Qiongzong                         |
| f. Meixian      | o. Main safe full heading date       |
| g. Shantou      | p. Relatively safe full heading date |
| h. Guangzhou    | q. Proper transplanting date*        |
| i. Gaoyao       |                                      |

\*Start from the main safe full heading date and take  $V_m = 60$  days. If the safe full heading date comes earlier, the growth period in the main field must be taken as longer.

b. Breed and Popularize Good Varieties, Take Advantage of Local Conditions to Improve Field Management and Scientific Cultivation, Do Good Work in Reforming Farming Methods

To skip over the Cold Dew Wind, such varieties as Hanluzao [Han-lu-tsao 1383 7216 2483], Pingguang [P'ing-kuang 1627 1639], Qiubaizao [Ch'iu-pai-tsao 4428 4101 2483] and the fanqiu varieties Guichao No 2 [Kuei-ch'ao 2710 2600], Qing'erai [Ch'ing-erh-ai 7230 0059 4253] and Zhenzhu'ai [chen-chu-ai 3791 3796 4253] and various early-late hybrids can be used, with heading and flowering before the Cold Dew; for resistance to the Cold Dew Wind, it is possible to use relatively cold-resistant varieties such as Guang'er Xuan'er [1639 0059 6693 0059], Baotai [Pao-t'ai 0545 5150], Baoguang [Pao-kuang 0545 1639], Qiuerbai [Ch'iu-erh-pai 4428 0059 4101],

Erbaiai [Erh-pai-ai 0059 4101 4253], Qinglanzao [Ch'ing-lan-tsao 7230 5695 2483], Zhaiyeqing [Chai-yeh-ch'ing 4504 0673 7230] or geng varieties. But for a variety of reasons the current late rice varieties are not fully adequate: if the early-maturing varieties and the geng types with cold resistance do not give high yields, the late-maturing varieties give high but not steady yields, and the early-maturing fanqiu varieties do not give steady yields, all these facts produce certain contradictions and difficulties for production. Breeding should produce new breakthroughs to meet the requirements of the situation. In the current stage, it is necessary to take advantage of local conditions and do well in crop rotation planning and pairing of varieties, and to make use of the "three earlies" (early sowing, early planting, early cultivation) and improve cultivation technology based on rational use of fertilizer and water so as to increase the resistance of paddy rice to natural factors. Weather stations at all levels should increase the accuracy of their medium and long range weather forecasting so as to aid in proper planning and management of late crops. As regards reform of the cultivation system, in the high-altitude, cold regions to the extreme north of the province or mountainous regions in the northeast, owing to the seriousness of cold damage and the unsuitability of planting late rice, a changeover to intermediate rice or early rice of temperature-sensitive types which flower and ripen before the Hanlu wind should be considered; and those areas which have the proper conditions should plant autumn potatoes as a follow-on crop.

#### c. Improving Field Microclimates and Environmental Conditions

During the Cold Dew Wind period watering can be used to adjust temperatures as well as sprinkling to adjust humidity, fertilizing to give added vigor, and application of chemicals to maintain warmth; this series of measures will decrease the danger presented by the Cold Dew Wind (the effects are more marked in the case of the dry Cold Dew Wind). If before the Cold Dew Wind begins a side dressing of fertilizer for panicle formation is applied, vigorous stems will be put forth and good reproduction and growth qualities fostered. When the wind arrives foliage dressing (or nutrients) should be applied and irrigation employed (none in the daytime and applied at night to a depth of 2-3 cun), or temperature-maintaining substances sprayed to keep the temperature up and increase the humidity; timely additional fertilizer may be given following the wind; and attention should be paid to protecting against white withering and the like.

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GUANGDONG

## AGRICULTURAL INSTITUTES DISCUSS PLANS FOR NEW YEAR

### Editor's Note

Guangzhou NANFANG RIBAO in Chinese 2 Jan 80 p 3

#### [Article] Editor's Note

[Text] With the advent of the first springtime of the 80's, we express our highest respects to the scientists and technicians who have waged an arduous struggle and scaled the ramparts on behalf of the four modernizations and who have labored assiduously to make contributions to the people, wishing them greater victories in the new year.

Recently we have sent letters to some comrades on the front of scientific instruction asking them to discuss plans for the new year, such as what are the objects of their struggle this year? How will they overcome the difficulties they might encounter? In the implementation of policies toward intellectuals, what problems do they most hope to solve? Today's publication carries their replies.

### Controlling Nematodes

Guangzhou NANFANG RIBAO in Chinese 2 Jan 80 p 3

[Article by Feng Zhixin [7458 1807 2450], assistant professor at the South China Agricultural Institute: "Controlling Nematodes in Plants to Develop Agricultural Production"]

[Text] Recently the central government's Ministry of Agriculture issued a Merit Citation, First Class and issued award money for "a Study of Nematodiasis in Farm Crops," for its advancement of technology in agriculture and livestock raising during 1978. This provided us with great encouragement and spurred us on. We express our heartfelt gratitude to the party and the government for its concern and we resolve to devote our entire energies to the development of research into plant nematology for our country.

Nematology is a new science and it is also a rather new area of plant protection. Plant nematodes are parasites that exist widely in numerous farm crops, giving rise to various kinds of nematodiasis that cause a decline in the quality of the crops, reduce yields or even cause death. Crop nematodes may also transmit fungi, bacteria and viruses, which frequently inflict tremendous damage on forestry and agricultural yields. Consequently, during the past 20 years and more, this science has seen great development abroad, but domestically it remains a weak link. In 1972 we began research in this subject to meet pressing needs in agricultural production. Even though the campaign against the four pests (rats, bedbugs, flies, and mosquitoes) was in full swing at that time and conditions for scientific work were sorely lacking, in consideration of the ardent expectations of us on the part of the party and the people, we fostered lofty ideals and set high goals, cleared away distractions, and persevered. During the past 8 years we have completed a total of more than 10 research topics, have written 16 research reports and treatises, have filled in some gaps in theory about our country's crop nematology, and have made preliminary discoveries of more than 10 new plant diseases caused by nematodes and new varieties of nematodes. We have also undertaken rather systematic research and experiments on nematodiasis in paddy rice, mulberry, oranges and tangerines, and tea seedlings, have preliminarily mastered the laws governing the occurrence, extent of damage, infestation, and pathogenesis, have proposed overall control measures that emphasize "cropping controls," and which in experimental use and spread through some areas of nematode infestation both inside and outside the province have been quite effective.

Science and technology must blaze a trail for the four modernizations with necessity being the mother of invention. In welcoming the advent of the first spring of the 80's, we should redouble our efforts and better complete the research tasks that the state has given us. Not long ago the Ministry of Agriculture held a conference in Guangzhou that set up the All-China Agricultural Crop Pathogen Nematode General Survey Coordination Unit, in which the South China Agricultural Institute is the mainstay. We are fully confident that through proper coordination, we will do our best to complete during 1980 all survey and authentication work on the pathogeny of nematodes in south China, central China and north China, and that 1982 will see completion of a nationwide survey to make a new contribution to the development of agricultural production and to realize the four modernizations.

#### Developing New Rice Varieties

Guangzhou NANFANG RIBAO in Chinese 2 Jan 80 p 3

[Article by Chen Weiqin [7115 3555 2953], director of the Rice Research Institute of Provincial Agricultural Institute: "Research on Wild Rice to Breed New Varieties"]

[Text] In 1980 we will devote more energy to research work with wild rice. Wild rice has endured the tests of a long time in nature and has

been preserved down to the present time, and though mostly it does "not prove out," there are some kinds with wide adaptability and high resistance to pests and diseases. Use of such superior varieties of wild rice for genetic breeding to develop a new cultivated variety of wide adaptability and with strong resistance that will also produce bumper yields requiring less investment of time and less use of agricultural chemicals, so as to reduce pollution, is an important present trend in international rice breeding work.

South China offers a great abundance of wild rice resources. Last year we carried out surveys and examinations in Boluo County and on Hainan Island, collecting about 500 specimens.

This year we would like to work together with the provincial Bureau of Agriculture and with prefectural and county agricultural bureaus to make further focused surveys and collections so as to clarify the distribution and laws governing wild rice resources in our province, and to collect more varieties of wild rice and samples of their ecotypes.

For the samples already collected, we want to organize forces from many disciplines and carry out, by stages and in batches, an appraisal of their resistance to diseases and pests such as blast of rice, bacterial blight and rice leafhoppers, sifting out for biological study those materials possessing high resistance and resistances of numerous kinds. This would then be followed by research on the genetics of their important characteristics, so as to be able to know what to pay attention to in the selection of parent pairs, in the methods of breeding, and in the selection of later generations when they are used as breeding materials. If these tasks are performed well, new high yield varieties may be bred.

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GUANGDONG

CHAOYANG COUNTY'S 1979 GRAIN YIELD HIGHEST EVER

Guangzhou NANFANG RIBAO in Chinese 9 Jan 80 p 1

[Text] Average per mu yields from the more than 542 million mu of grain crops in Chaoyang County during 1979 reached 1,675 jin, with total production amounting to 909.46 million jin. Per unit yields and total yields amounted to 7.9 percent and 5.8 percent over the previous year to create the highest levels on record.

Last year the Chaoyang County Committee diligently studied the two documents on agriculture from the central government, criticized the extreme left line, summarized the lessons of experience, changed its style of leadership, paid genuine respect to the autonomy of production teams and did the following: first, it passed downward only the state requisition purchase quota targets for total grain production, population increase, commune member income, and for grain, oil, sugar, flax, and fruits; it did not pass downward quotas for area to be cultivated; second, in the make-up of production, it recommended a change in the system of growing a single crop, insofar as this accorded with the state plan guidance and arrangements pertaining to fitting methods to the local situation, but it did not rigidly stipulate the ratio between grain crops and cash crops for each brigade and commune; third, the various concrete measures for increases in production that the County Committee put forward were not in the form of directives but offered only for consideration. In this way, it was possible both to assure the completion of increased grain production quotas and to permit brigades and communes to arrange the make-up of their production in accordance with local conditions with benefits for mustering the enthusiasm for production of the broad masses of cadres and the people, for improving cultivation techniques, and for implementing scientific farming, thereby bringing about average per mu yields of 791 jin of early crop rice and average per mu yields of 788 jin of late crop rice from the several hundred thousand mu of paddy fields in the entire county, which are high yields on a large area for both early and late crops.

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ZHANJIANG PREFECTURE SETS RECORD FOR GRAIN OUTPUT

Guangzhou NANFANG RIBAO in Chinese 3 Jan 80 p 1

[Article by Zeng Huicun [2582 1920 1317], reporter for the newspaper: "Zhanjiang Prefecture Wrests Bumper Harvest of Record-Breaking Proportions Through Implementation of Party Policy and Extension of Scientific Farming"]

[Text] Last year Zhanjiang Prefecture increased grain production by more than 600 million jin. This was a bumper harvest of record-breaking proportions with both aggregate yields and per unit yields being higher than the 1975 level, which was the highest in history.

Last year Zhanjiang Prefecture made some rational adjustments in the composition of its agriculture, and revived and extended some cash crops in consequence of which the area sown to grain was reduced by more than 210,000 mu over the year before last and by more than 900,000 mu over 1975. Some comrades felt that "autonomy had gone too far and policies had become rightist," and predicted, principally on the basis of these events, a "certain reduction in grain yields." But the realities of production by the cadres and masses of Zhanjiang Prefecture last year proved these predictions wrong. The party's programs and policies aroused the enthusiasm of the broad masses of cadres and people so that last year work was solidly done and measures were implemented; the various major measures for increasing yields that had been called for over the years but that had been stalled on paper or in conferences, such as the extension over a wider area of superior varieties, the light sowing of seeds to produce plants with sturdy stalks, rational application of fertilizer with proper drainage and irrigation, began last year to be put into actual practice throughout the prefecture. Leadership on all levels concentrated their resources toward production with numerous comrades taking the lead in the study of techniques and in explaining techniques. Leadership comrades in the Zhanjiang municipal and suburban committees and secretaries of commune party committees joined together in advance of spring plowing to conduct a concentrated 4-day course that took the lead in the study of techniques, after which all levels held classes to train a total of more than 6,000 people. Both Gaozhou and Haikang counties

appropriated special funds for technical training classes with cadres and members of scientific farming small groups attending for study numbering more than 70,000 in an initial crop. This had a great impact on the launching of the campaign for scientific farming. Last year more than 1.1 million mu were planted to "Guichao" superior variety as an early crop throughout the entire prefecture and more than 200,000 mu of superior varieties of hybrid rice. Indications from agricultural departments are that this measure alone resulted in increased yields of about 100 million jin of paddy. For the late crop, two vigorous campaigns of assault were organized throughout the prefecture, one for the eradication of pests in the early period and one for protection against the "early October chill." These were on a scale so large and with an action so swift as has rarely been seen in recent years. In the course of irrigating to protect against chill, more than 800 million square meters of fields were irrigated throughout the prefecture. This work played a major role in solving the problem of dryness during the latter stages of paddy rice growth and assured a high fruiting rate and fully developed grain last year. Because these measures were instituted for both the early and late crops, per mu yields last year averaged 31 jin increases over those of 1975, which were the highest ever recorded. The large increases in per unit yields last year more than made up for the losses resulting from adjustments made in the cultivated area for crops, and this was an outcome that those comrades who had predicted reduced yields had never expected. Once the record breaking bumper harvest had become a fact, an argument broke out as to whether this had been the "work of the heavens" or the "work of man," with some comrades feeling that the bumper harvests of last year had been more the "work of heaven," than the "work of man," while some other comrades disagreed with this view. While acknowledging that the weather had been quite good for both the early crop and the latter stages of the late crop, with no "early October chill" appearing in most parts of the prefecture with the exception of a few places in Xinyi and Gaozhou where low temperatures caused some damage, and while admitting that this was a favorable factor that had to be taken into consideration, still the high yield fields with per mu yields of 1,403 jin of early rice and 1,396 jin of late rice had shown up in Xinyi, and the more than 400 mu of fields producing bumper per mu yields in excess of 1,000 jin of rice had shown up in Gaozhou rather than in the southern counties. . . . entirely free from the effects of the "early October chill." This fully demonstrated that it was not the weather that was the major factor in wresting increased yields throughout the prefecture but rather the policies of the party that aroused the enthusiasm of the cadres and the masses.

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LIANGSHAN COUNTY MAKES ADVANCES IN HYBRID RICE CULTIVATION

Guangzhou NANFANG RIBAO in Chinese 4 Jan 80 p 1

[Text] Major advances have been made in the cultivation of high yield rice hybrids at the Institute of Agricultural Science of the Lianshan Zhuang and Yao People's Autonomous County located in the high and cold mountain regions. Continuous experiments with two crops of hybrid paddy rice over a fairly large area during the past 2 years has produced average per mu yields in excess of 2,400 jin.

Last year the Institute of Agricultural Science at Lianshan grew early hybrid rice on 42.84 mu with average yields of 1,346 jin per mu, and late varieties on 43.2 mu with average per mu yields of 1,109 jin. Continuous cropping of two crops on 32.42 mu brought total yields of 78,451 jin for average per mu yields of 2,419 jin.

This agricultural science institute began small-scale experiments with hybrid rice only in 1976. Two years ago they received an assignment from the Sixth All-China Hybrid Rice Cooperative Conference to carry out experiments and study on the continuous cropping of two crops on 5 mu of land. Scientists, technicians, workers and cadres within the institute started out with a conscientious summarization of past practice and experience and formulated a program for testing varieties that took account of objective laws. This was the foundation for their cultivation work. Through meticulous work, they met requirements without difficulty and when the time for harvest arrived, the appropriate departments of the Guangdong provincial government sent a work team to make the experimental harvest.

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NANHAI COUNTY RICE YIELD SETS RECORD

Guangzhou NANFANG RIBAO in Chinese 7 Jan 80 p 1

[Text] Both the early and the late rice crops in Nanhai County showed increased yields in 1979 with average yields per mu exceeding 1,300 jin for the first time, and with an average per mu increase of 129 jin over last year, to create an unprecedented record. Total yields increased more than 13 million jin over those of 1977, which were the highest ever recorded. These yields have broken the pattern that has endured over the past 13 years in which yields from one crop have been high and from the other crop low. As long ago as 1965 Nanhai County yields of rice per mu exceeded 1,000 jin. But subsequently yields wavered back and forth without making any forward progress as a result of the leadership of agriculture without fine regard for natural laws. In 1979, the county committee learned this lesson and, taking account of the existing situation in the county, fitted together the elements of production, implemented measures for increased yields, and realized a sizeable increase in the level of scientific farming throughout the county: in the allocation of land to varieties, it changed the former lopsided seeking after high yields whereby late maturing high yielding varieties were improperly popularized, replacing the late maturing varieties that dominated the early crop with medium-late maturing varieties, replacing the "sitting autumn" varieties that dominated the late crop with typical late crop varieties and making a proper mix with some high yield "sitting autumn" varieties. For the propagation of sturdy stalks, they not only used plastic sheets to protect rice seedlings from the cold over 11,000 mu of the early crop, but also focused on light sowing over large areas to raise sturdy seedlings. For the late crop, early sowing was done.

Fertilizer and water management were conducted by using the scientific management method that accords with the laws of rice growth by promoting "large amounts in the early stages, restraint in the middle stages, and a good amount at the end," which greatly increased the effective number of spikes, increased the fruiting rate and the per 1,000 weight of the grains.

In addition, they gave attention to the strengthening of leadership of the plant protection crops, conscientiously taking care to check and

report plant diseases and insect infestations and doing preventive and curing work.

Statistics from pertinent departments show a decrease by 42 tons in application of agricultural chemicals over 1979, for a saving in expenditures of more than 240,000 yuan over the previous year.

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GUANGDONG TAKES MEASURES AGAINST POTENTIAL DROUGHT

Guangzhou NANFANG RIBAO in Chinese 5 Jan 80 p 1

[Article: "Prevent Drought, Resist Drought and Do a Good Job in Preparing To Plant"]

[Text] Since early fall last year, little rain has fallen anywhere in our province, and in many places scarcely a drop has fallen, with adverse consequences for the normal replenishment of reservoirs. At the present time, water impounded in reservoirs throughout the province is vastly less than for the same period last year, amounting to only about half the normal capacity. In some places creeks and rivers no longer flow and wells have gone dry; in certain areas drinking water has begun to become a problem for people and animals alike. The meteorological forecast calls for a continuation of less than normal rainfall during the period January to April, and rainfall is likely to be particularly scant in the southwestern region and over Hainan Island. The dry weather poses a serious threat to this year's early rice yields. We must mobilize at once to make complete preparations against a spring drought so as to assure problem-free yields from spring planting.

This is the first year for great accomplishments in the decade of the 80's. Doing a good job in agricultural production this year and harvesting bumper crops across the board is of major significance in the development of an excellent situation in rural villages and in hastening steps toward construction under the four modernizations. The specter of a drought is a great enemy to the harvesting of a bumper early crop. With this enemy at hand, it is necessary to rise in defense and to win the battle. We must unflinchingly implement the two documents on agriculture from the central government, further implement each of the party's policies, muster the enthusiasm of the broad masses of people, act early, prevent drought and resist drought, and do a good job in preparing for planting to lay down a firm foundation for a bumper harvest from this year's early crop.

In order to prevent drought and resist drought, in addition to paying attention to the management of crops that are wintering over, each area should properly allocate its labor force and fit methods to the local situation in doing a good job of construction for water conservancy. It

should concentrate its principal efforts on projects of benefit to crops this year, thoroughly clearing ditches, preventing leakage, and maintaining and repairing so as to restore and enlarge the benefits of irrigation. At the same time it is necessary to enhance management over existing water conservancy projects, and in any case involving a reservoir devoted principally to irrigation where a conflict exists between water used to generate electricity and water used for irrigation, priority must go to use of the water for irrigation. Attention should be given the maintenance and repair of electric power lines for agriculture and of electric machinery used for raising water in order to assure the normal operation of machine irrigation equipment. Well irrigation is an effective means of exploiting underground water resources, and each area should summarize experiences and continue to do a good job both in sinking wells to resist drought and in integrating the use of wells. Additional attention must be given to increasing the supply of water and reducing its consumption with early blocking and damming of rivers being done to bring water into ponds and reservoirs and fields as a stopgap method of resisting drought, so that river water will be fully utilized in satisfying the demands of spring farming for water. Every trade and profession, and every sector, should exert every effort to help prevent drought and resist drought by doing a good job in the supply of electric power and petroleum needed to prevent drought and resist drought, and singlemindedly exert efforts to fight this battle to prevent drought and resist drought in order to make a new contribution to the development of agriculture in our province.

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## HUA COUNTY ACHIEVES BUMPER RICE HARVEST

Guangzhou NANFANG RIBAO in Chinese 22 Dec 79 p 1

[Article by Zhou Caihuang [0719 5591 7806]: "Hua County Harvests Bumper Rice Yields for 4 Years in a Row. Two Systems of Job Responsibility Stir Enthusiasm of Cadres and Commune Members"]

[Text] Both total yields and per unit yields of rice have exceeded the highest levels in history in Hua County this year. This is a continuation into the fourth year of the bumper yields that have been attained during the past 3 years since 1976. Despite a reduction since last year by more than 10,000 in the rice area throughout the county, total yields exceeded by more than 25.2 million jin or 7 percent last year's yields, which were the highest ever recorded with per mu increases in yields averaging 87 jin. Fairly large gains were also recorded in hog births, peanuts, and fresh fruits, thereby bringing about "six increases and one decrease" (increases in production, harvests, distribution, accumulation, grain, and contributions with a decrease in costs). Thanks to the bumper harvest plus an increase in the procurement price of some sideline produce, cash distributions to the farming population throughout the county has shown an average increase of more than 27 yuan over last year. Such a large increase in income has not happened since collectivization. Commodities in rural markets are abundant, people are out in droves to buy, and transactions are lively with prices for some sideline farm products lower.

This year's bumper harvest in agriculture in Hua County is attributable largely to the implementation by the County Committee of the spirit of the Third Plenary Session of the 11th CCP Central Committee in setting up and strengthening a system of responsibility for production and a system of personal responsibility for cadres. As long ago as the winter of 2 years ago, some communes and brigades began work on a system of responsibility for production. By this year, production teams having a system of responsibility for rice production number 1,441 countywide in 77 percent of all production teams in the county. Various kinds of production responsibility systems have also been universally established for the management of foresteries, animal husbandry, sideline occupations, and fisheries.

Once a system of production responsibility was established or revived, farm work efficiency rose from 30 to 50 percent over last year and the quality of farm work has also been good. The County Committee took advantage of the system of personal responsibility for cadres to give impetus to further changes in outlook and work style of county-level and commune-level cadres. This year, cadres at both the county and commune level have their own private experimental field caretaker unit. Cadres and commune members have responded, and now county and commune cadres implement measures for increased production very accurately and meticulously. The superior rice variety, "Guichao" is the variety that has been vigorously spread throughout Hua County during the past 2 years and the one that by this year has been planted on 380,000 mu, which is more than 50 percent of the total paddy fields throughout the county. This has played a major role in increased yields throughout the county.

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SCIENTIFIC HOG RAISING PROMOTED IN XINHUI COUNTY

Old Feeding Methods Discarded

Guangzhou NANFANG RIBAO in Chinese 22 Dec 79 p 2

[Article from the Political Research Office of the Provincial Agricultural Committee and the Composite Survey Unit of the Xinhui County Livestock Office: "Heavy Stress on Scientific Hog Raising Shows Remarkable Results in Xinhui County. How Can Collective Hog Raising Reduce Feed Consumption, Produce Quick Weight Gains and Lower Costs? Entire County Increases Hog Production Year After Year and Completes Export Quotas for Upward Adjustment of Live Hogs for the Entire Year 3 Months Ahead of Schedule"]

[Text] Editor's Note: The collective hog raising industry in many places in our province consumes a lot of feed, fattens hogs slowly, and has high costs as a result of continued use of old feeding methods, and this is a major reason for losses in hog raising in some places. Xinhui County has found that vigorous efforts to change old methods and spread scientific hog raising has resulted in reduced consumption of feed, quick weight gains, and low costs, which is a good way to change pig raising from a losing to a money making proposition. These experiences are offered to other places for consideration.

For the past several years the Xinhui County Committee and the Revolutionary Committee have adopted effective measures and vigorously popularized scientific hog raising to bring about a rapid upswing in collective hog raising and to promote the raising of hogs by commune members. Last year the number of pigs being fed throughout the county gradually rose to 750,000 head after a gradual rise from somewhat more than 540,000 head in 1974, for a total increase of almost 40 percent. The straight line on the collective pig raising graph rose, and as of the end of last year, collectively raised pigs in pens numbered 1.7 times the 1974 figure. A rather large increase in the marketing rate of slaughter pigs also occurred. Throughout this year, a steady development has occurred in the hog raising industry throughout the province with total annual export quotas for an upward adjustment in live pigs being met 3 months ahead of schedule. In the amount of its

upward adjustment and in the total number of dan of pork taken in requisition purchases by the state, it is the champion of Foshan Prefecture.

Though repeated emphasis was given to the development of collective hog raising in Xinhui County prior to 1974, nothing ever came of it. The reason was that the pig lots run by communes and brigades at that time stuck to a lot of old methods of feeding hogs, which resulted in slow weight gain, long periods in the lots, waste of labor, consumption of a lot of feed, high costs, low income and even losses. The No 1 brigade of the Huancheng Commune collectively raised four batches of hogs, losing money on every batch. In 1973 the last batch was turned over to commune members for feeding with severe losses resulting, in consequence of which it was decided to raise hogs no further. It was at this time that Ye Jin [5509 6602], deputy station chief of the livestock station of Huancheng Commune took a look at a rapid hog fattening method worked out over a number of years by Tan Delie [6223 1795 0441], a member of the Jiulong No 2 Brigade of the same commune, which he then combined with his own knowledge of scientific hog raising learned from study elsewhere to experiment with a batch of hogs. As a result, he not only did not lose any money; he earned money. Ye Jin used this deed to convince comrades in the Chennan No 1 Brigade, and in September 1974 they began a test raising of 18 hogs for which he personally gave guidance in the scientific methods of feeding and raising hogs. As a result, the number of hogs increased with time and costs fell. By 1978, the entire brigade raised 748 head at a profit of more than 26,000 yuan. In 1975 after the Xinhui County Committee had discovered this advanced experiment, it established the Chennan No 1 Brigade as a model for scientific hog raising, and organized cadres from various commune brigades to visit the brigade on several occasions to learn from it. Various communes also selected stockmen to work at this brigade after which they operated their own scientific hog raising units with experiences in these units being used to promote work in the entire area. "A single lamp can illuminate a large area." Thereafter, communes and brigades changed one after the other from cooked feed to raw feed, changed from the feeding of mostly coarse fodder to the feeding of mostly concentrated feeds, and changed from a single feed to a mixture of feeds to begin the expansion of scientific hog raising throughout the county. As part of the process of popularizing scientific hog raising methods, the various levels of leadership organizations in Xinhui County stressed a buildup of a corps of stockmen. Every year they conducted scientific hog raising classes of varying lengths from the county to the communes to train stockmen, cadres for the management of hog raising, and hog lot heads in communes and brigades. Between June and October last year, the county and the various communes launched hog raising competitions, at the same time selecting and sending to training young stockmen slated for jobs in raising hogs. The competitions lasted a month at the end of which a check and appraisal was made on the basis of amount of feed consumed, and the cost and the rapidity of fattening, with material prizes going to the winners. Results of competitions in the six competition areas organized by the county were as follows: of the 3,020 hogs in

the competition, each hog put on an average of more than 38 jin of weight with 3 jin 3 liang of mixed feed being consumed for each jin of weight gained. Of this feed, concentrated feed amounted to 2 jin 2 liang, and the cost per jin of gross weight was 32 fen.

A large amount of concentrated feed is needed to launch the scientific raising of hogs. It is estimated that for each jin of gross weight, the amount of mixed concentrated feed required is equal, in general, to the value of 3 jin of paddy rice. Thus, to raise one hog from shoat to market, about 360 jin of paddy is required if the hog is sold at a gross weight of 120 jin. In order to solve the problem of a shortage of feed, both the county and the communes annually retained a portion of the total grain harvest for use as feed and every commune also developed sources for feed, suiting its methods to local conditions. In communes with lots of land little of which is arable, reliance is placed mainly on heavy cultivation of food grains other than wheat and rice to solve the problem of feed for the hogs. In the five communes of Xiaogang where there is a large population but little arable land, it is through the expansion of wheat cultivation primarily that the feed problem is solved. In the six communes of Huancheng, the source of feed derives one-third from expanded cultivation of wheat and grains other than wheat and rice, one-third from collective grain supplies as a whole, and one-third from the purchase of grain at negotiated prices. Hetang commune in the cash crop area uses a combination of hogs, pond fish, and silkworms with the main source of feeds for the collective raising of hogs coming from the sale of pond fish and silkworm cocoons for grain. Last year that commune sold enough pond fish to earn 18,000 dan of grain. In these ways by fitting methods to local conditions the source of feeds is enlarged and the material foundation for the collective raising of hogs is greatly developed.

#### Concentrating on Nutritional Needs

Guangzhou NANFANG RIBAO in Chinese 22 Dec 79 p 2

[Article: "Benefits Numerous From Scientific Hog Raising"]

[Text] Scientific hog raising includes scientific care and scientific management. At the present time, raising hogs in our province depends largely on having humans care for them, but as mechanization develops, the level of scientific hog raising will continuously rise. Practical experiences in Xinhui County are a tale of experiences in scientific care in which the principal ingredients were: adapting to raw foods that pigs like to eat, increasing their appetites, and at the same time changing from cooked feed to water-soaked fresh feed, which both helps preserve nutrients in the feed and saves fuel; bearing in mind that pigs have single chambered stomachs and so cannot very well digest and absorb coarse fibers. If they do eat excessive amounts of coarse fibers, the burden on their intestines and stomach will be increased with consequent increase in the depletion of heat, so coarse food was largely replaced by concentrated food; based on pigs' rather high protein requirements and their

nutritional needs for fattening, change was made from a single feed to a mixture of feeds. Results obtained from all these changes were as follows:

First, fattening was accelerated. According to statistics from 20 communes in Xinhui County, the marketing rate for slaughter pigs was 84.16 in 1974, but by 1978 it had climbed to 96.68 percent. (If sows and shoats not sent to market are included, the marketing rate would be 70.78 percent.) Within 4 years there was an increase of 12.52 percent for an annual 3 percent increase.

Second was growing more meat with less feed. Under the old system of hog raising, large amounts of feed were consumed to keep the hogs alive with much eating taking place without any accretion of flesh. Increase of 1 jin of gross weight required between 8 and 10 jin of feed with a maximum of 27.5 jin of concentrated feed being used, which was not at all cost effective. Under the new hog raising methods that have been adopted in which attention is given to nutritional needs in the growth process of slaughter pigs, every 3 jin or so of feed can be converted into 1 jin of pork.

Third was a decline in production costs. The change from cooked food to raw feeds that have been soaked in water under the new method of hog raising has by itself effected an average saving of firewood amounting to about 10 yuan per pig.

9432  
CSO: 4007

FAMILY CHICKEN RAISING FOUND PROFITABLE

Guangzhou NANFANG RIBAO in Chinese 30 Dec 79 p 1

[Article by Reporter Li Tanghui [2621 2768 6540] and Correspondent Su Yan [5685 3601]: "More Than 4,000 Yuan Income From Raising Upwards of 1,000 Chickens. Commune Member, Liu Fengchao [0491 7364 6389] Goes All Out To Develop a Family Sideline Occupation"]

[Text] At an enlarged meeting of the party committee of Zhuliao Commune in the environs of Guangzhou Municipality, Liu Fengchao and family, members of the No 12 Production Team of the Liangtian Brigade, received the praises of the party committee of the commune. Through hard work and study, and with solid faith in the policies of the party, they had achieved outstanding accomplishments in going all out to develop a family chicken raising industry even while actively being engaged in collective production.

In June of this year, Liu Fengchao's family bought more than 1,400 young chicks to take care of at the farmer's market, of which 90 percent lived. One hundred days later, each of the 500 of them that weighed more than 2 jin were taken to market in 2 separate batches, and the remaining 600 or so will be taken to market before the lunar New Year for a net total income of more than 4,000 yuan. By way of propagandizing and popularizing Liu Fengchao's advanced experiences in family raising of chickens, the party committee of the commune organized cadres attending the conference to pay visits to the Liu family chicken farm, where everyone became very much inspired.

The middle age commune member, Liu Fengchao and his wife have five sons and daughters. Liu Fengchao received praise from the brigade for the quick fattening of the six hogs being collectively raised, for which he is responsible. His wife has become an advanced commune member in the brigade for her work in the fields, where she works full time and where the fields for which she is responsible are well tended. Their five sons and daughters study hard in school. Over the years Liu Fengchao has read extensively about raising chickens, has visited several chicken farms,

and has collected and accumulated a great deal of material on chicken raising. In order to do a good job of raising the flock of chickens, the family used their spare time, divided the work and cooperated, diligently did a good job with the planting required for chicken feed, in making purchases, in processing, and in feeding the chickens as well as in cleaning up. As a result, the flock grew well not only to provide upwards of 1,000 fat chickens to the market but also to collect more than 10,000 jin of fine quality chicken manure fertilizer for the brigade.

9432  
CSO: 4007

## BRIEFS

LIANNAN COUNTY RICE PRODUCTION--Building on its bumper harvest of an early rice crop in 1979, the Liannan Yao Nationality Autonomous County harvested another bumper late rice crop on more than 40,000 mu. According to preliminary statistics, total annual average per mu yields reached 1,117 jin with both total and per mu yields exceeding highest recorded levels. Rather large increases in yields were registered in oil crops, soybeans and cassava. Liannan County lies in the northern part of our province where numerous mountain chains, the late arrival of spring, and the early arrival of fall make for difficulties in rice production. For the late rice crop in particular, yields have been low and uncertain for a long time. In order to change this state of affairs, every level of party and government organizations actively introduced fine varieties of hybrid rice to match the natural conditions of the county. As of 1979, hybrid rice constituted upwards of 70 percent of the late rice crop throughout the county. By the middle of September, these hybrid rice varieties have already come into full head, thereby avoiding the "early October chill," and triumphing over the dryness of autumn to produce per mu yields that average in excess of 670 jin, or between 200 and 300 jin more yield per mu than from conventional varieties. [Text] [Guangzhou NANFANG RIBAO in Chinese 7 Jan 80 p 1] 9432

LIANJIANG COUNTY RICE HARVEST--In 1979 Lianjiang County had the largest bumper harvest since liberation, totaling more than 569 million jin for an increase over the previous year of 67 million jin and a 9.7 percent increase over the 1976 highest yields on record. Per unit yields also exceeded the highest recorded levels. Increased yields of peanuts, sugarcane, and soybeans were also registered, with increases as well in the number of chickens, ducks, geese, hogs and oxen. After the bumper harvest, the amount of grain offered for sale to the state by commune members increased, and some communes that had formerly consumed excess grain rather than sell it, this time offered more grain for sale to the state rather than eat it. The great bumper rice harvest in Lianjiang County derived from the implementation of the policies formulated at the Third Plenary Session. They highlighted two matters: one was respect for the autonomy of the production teams. Each team was able, within the limitations of the state plan, to decide on crop arrangements for its own

team, selection of varieties, measures to be taken for increased production and distribution of products. The other was diligent institution of the policy of distribution in accordance with labor with greater rewards for greater labor, which overcame the egalitarianism by which rewards were calculated in the past, thereby stirring the enthusiasm for production of cadres and commune members to bring about a great bumper harvest. [Text] [Guangzhou NANFANG RIBAO in Chinese 7 Jan 80 p 1] 9432

HAINAN SPRING FARMING--At present, the people in Hainan have fulfilled the task of sowing early rice and transplanted 1 million mu of seedlings. At the same time, a large number of economic crops have also been planted. In 1979, the total output of grain in Hainan increased by 350 million jin over 1978, an increase of 22 percent. By the time the "Little Cold" [6 January] began, 45 million jin of rice had been sown, thereby insuring that 2.2 million mu of irrigated farmland was planted with sufficient seedlings. This year, 70 percent of the seed strains were of hybrid varieties. [Haikou Hainan Island Service in Mandarin 0330 GMT 13 Feb 80 HK]

STATE FARMS: ANIMAL HUSBANDRY--The 13 state farms that are under the jurisdiction of the Guangzhou Municipality and are located in the Guangzhou suburbs are doing well in animal husbandry, which is now their main undertaking. In the first 9 months of 1979, they together supplied to the market 8,891,073 jin of cow milk, 275,098 head of live chickens and 32,184 head of live pigs, an increase of 16 percent, 49 percent and 133 percent over the same period of 1978 respectively. [Guangzhou NANFANG RIBAO in Chinese 11 Nov 79 p 2]

ZHANJIANG PREFECTURE SCIENTIFIC FARMING--Attention has been paid to scientific farming and increasing yield per unit area in Zhanjiang Prefecture, Guangdong Province. In 1979, the prefecture made proper readjustments in crop arrangement in accordance with the guidelines of the 3d Plenary Session of the party's 11th Central Committee. The grain acreage was reduced by some 530,000 mu from that in 1978, and yet the total grain output increased by 15.6 percent over that in 1978. One major factor for the increased grain output was the sharp increase in per-mu yield. The average per-mu grain yield of the prefecture was 908 jin in 1979, an increase of 137 jin over that in 1978. [Beijing Domestic Service in Mandarin 0400 GMT 24 Feb 80 OW]

CSO: 4007

GUANGXI

BRIEFS

GUANGXI ANIMAL HUSBANDRY--Bank and credit cooperatives in the region have actively supported mountain communes and brigades to develop animal husbandry. According to statistics of 32 counties last year, the banks and credit cooperatives had altogether loaned 4,170,000 yuan for this purpose. The banks and credit cooperatives seriously studied and proceeded from actual conditions to provide credit in a rational way so as to support animal husbandry. [Nanning Guangxi Regional Service in Mandarin 1130 GMT 7 Feb 80 HK]

GUANGXI AGRICULTURAL RECLAMATION PROGRESSIVES--The Guangxi Congress of Progressive Collectives and Producers of the Regional Reclamation System was held in Nanning from 6 to 10 February with the participation of 460 representatives throughout the region. Also present at the congress were Xiao Han, Ren Gengqing and Guo Cheng, leading comrades of the Guangxi Regional CCP Committee and the regional people's government. Xiao Han, secretary of the Guangxi Regional CCP Committee and vice chairman of the regional people's government, gave a speech. [Nanning Guangxi Regional Service in Mandarin 1130 GMT 11 Feb 80 HK]

CSO: 4007

GUIZHOU

BRIEFS

GUIZHOU COUNTY YEAR-END DISTRIBUTION--Guiyang, 16 Feb--The Guiyang County CCP Committee in Guizhou has firmly grasped year-end distribution to develop the peasants' enthusiasm for production. As a result, the county has promoted its winter production. Now the absolute majority of the county's more than 3,000 production teams have finished distribution work, a new phenomenon not seen over the past 10 years and more. Now additional fertilizer has been applied to wheat and rape crops on the county's 187,000 mu. [Beijing XINHUA Domestic Service in Chinese 0115 GMT 16 Feb 80 OW]

CSO: 4007

HEILONGJIANG

BRIEFS

HEILONGJIANG GRAIN PROCUREMENT--Overcoming natural disasters and achieving a bumper grain crop harvest, Heilongjiang Province and the vast majority of its commune members and farm workers eagerly sold grain to the government. According to statistics compiled by the provincial grain department on 5 December, 8.86 billion jin of grain has been procured by the government over the entire province with an excess amounting to 6.7 percent, thus completing the government purchase task with 570 million jin more than that of the same period last year. The work related to the government grain purchase was carried out conscientiously in accordance with party policy. The purchase price has been raised according to the regulation, with additional payment made for the portion in excess of the allocated amount. As a result, in general the income of all farmers rose. [Text] [Beijing BEIJING RIBAO in Chinese 14 Dec 79 p 4] 9113

HEILONGJIANG SONGHUAIJIANG FARMING PREPARATION--Songhuaijiang Prefecture, Heilongjiang, has accumulated 64 million dun of manure, improved 3,400 mu of farmland and removed 100,000 cubic meters of sand and stone. [Harbin Heilongjiang Provincial Service in Mandarin 1100 GMT 24 Feb 80 OW]

AGRICULTURAL SUPPORT--Anda County, Heilongjiang, has made great efforts to build raw material bases for its light and textile industries. In 1979, as a result of such efforts, the county provided for its light and textile industries 1,400 dun of fresh milk, more than 1,200 head of beef cattle, more than 3,700 mutton sheep, more than 33,700 pigs, 153,000 sugarbeet and 3,000 dun of reed. At the same time, the county built a number of light and textile industrial plants including two dairy product plants, three paper mills, two flax mills and one sugar refinery capable of processing 500 dun of sugarbeet per day. The county's light and textile industrial output value reached 42.055 million yuan, or 37 percent larger than 1978, accounting for 71.5 percent of its total industrial output value. [Harbin Heilongjiang Provincial Service in Mandarin 1100 GMT 23 Feb 80 OW]

COUNTY ENTERPRISES--Harbin, 7 Feb--Zhodong County of Heilongjiang Province continued to develop its commune- and brigade-run enterprises in 1979. Total output value increased by 40 percent and profits by 20 percent over 1978. At present, this county has 210 commune- and brigade-run plants built with local resources. [Beijing XINHUA Domestic Service in Chinese 0158 GMT 7 Feb 80 OW]

HENAN

HENAN COMMENTARY URGES PROMOTION OF COTTON PRODUCTION

HK221107 Zhengzhou Henan Provincial Service in Mandarin 1130 GMT  
20 Feb 80 HK

[Henan commentary: "It Is Necessary To Quickly Promote Cotton Production"]

[Excerpts] Through implementing the spirit of the national conference on cotton production, all places in our province have now mobilized the activism of the peasants engaged in cotton production and speeded up the preparations for sowing cotton seeds.

However, we must see that our province's cotton production is a long way from meeting the requirements of national construction. Henan is one of the five big cotton-producing regions in the whole country. The area of our cotton fields accounts for one-eighth of the total area sown with cotton throughout the country. We must therefore promote cotton production and make output reach or surpass the highest level in history as quickly as possible.

The key to whether or not we can promote cotton production as quickly as possible lies in leadership. Leadership departments at all levels must continue to implement the spirit of the national conference on cotton production and enhance the understanding of the cadres and masses on the importance and urgency of developing cotton production. They must correctly handle the relations between grain and cotton. Leading comrades at all levels must learn science, technology and administration and correctly direct production. In administration, we must extensively establish the production responsibility system and put it on a sound basis. At present, we must concentrate our forces to allocate superior cotton seeds and train cotton technicians.

CSO: 4007

HENAN

BRIEFS

HENAN PREFECTURE AFFORESTATION--Zhengzhou, 20 Feb--Xinyang Prefecture in Henan Province has planted 1 million mu of fir trees. In the past several years, about 1 billion fir saplings have been cultivated in the prefecture. [Beijing XINHUA Domestic Service in Mandarin 0231 GMT 20 Feb 80 OW]

HENAN COTTON PRODUCTION--Zhoukou Prefecture now has 51 communes each of which has more than 10,000 mu of cotton fields. Last year there were only 43 such communes. The total area of cotton fields has increased from 620,000 mu to 720,000 mu. Xinxiang Prefecture has 880,000 mu of cotton fields. Anyang County has sunk 150 new mechanical wells and expanded its irrigated cotton fields to 280,000 mu. The county has collected some 1.5 million cubic meters of manure for cotton fields and trained 100 cotton technicians. [Zhengzhou Henan Provincial Service in Mandarin 1130 GMT 20 Feb 80 HK]

HENAN WHEAT SOWING--Henan has sown wheat on 61 million mu this year. The province has done well in combating drought, irrigated wheat on 32 million mu and applied manure on 27.5 million mu. After timely wheat field management, first grade wheat seedlings account for 30 percent of the total area of wheat fields in the whole province, second grade wheat seedlings account for 40 percent and third grade wheat seedlings account for 30 percent. [Zhengzhou Henan Provincial Service in Mandarin 1130 GMT 9 Feb 80 HK]

HENAN AFFORESTATION--Since winter, the people in Henan have planted trees on 455,000 mu, and built 916,000 mu of land for spring afforestation. They have also planted 36 million trees around the farmland. This winter, many areas have included afforestation in the important contents of winter production. [Zhengzhou Henan Provincial Service in Mandarin 1130 GMT 12 Feb 80 HK]

CSO: 4007

HUBEI

BRIEFS

HUBEI AGRICULTURAL COST ACCOUNTING--Some 1,800 production teams in Hubei will set up trial-points to carry out agricultural product cost accounting this year. To solve the problem of increased production without increased income, the provincial agriculture office set up 10 brigade trial-points to carry out agricultural product cost accounting in 1979 and achieved good results. Agricultural product cost accounting is a scientific method for economic administration. [HK201252 Wuhan Hubei Provincial Service in Mandarin 1100 GMT 7 Feb 80 HK]

HUBEI AFFORESTATION CIRCULAR--The Hubei Provincial CCP Committee and the provincial people's government issued a circular on 15 February on launching afforestation-month activities. The circular said: To quicken the pace of promoting this province's forestry, the provincial CCP committee and the provincial people's government have decided to launch mass afforestation-month activities around this year's Arbor Day from 20 February to 20 March. [HK260220 Wuhan Hubei Provincial Service in Mandarin 1100 GMT 16 Feb 80 HK]

STATE FARMS OPERATE INTEGRATED ENTERPRISE--A retail store of the integrated agricultural-industrial-commercial enterprise jointly organized by 14 state farms in Hubei was opened for business on the eve of the spring festival. This store is located at Wuchang of Wuhan and has three departments selling nonstaple food, eggs and poultry, and aquatic products, totaling 97 varieties, including popular wine and candies. These state farms have a total population of 180,000 and 960,000 mu of farmland, producing soybeans, sesame seeds, peanuts, cane sugar, pigs, cattle, sheep, fish and ducks in addition to grain and cotton. [Beijing RENMIN RIBAO in Chinese 19 Feb 80 p 1]

SELF-DETERMINATION HELPS STATE FARMS--Expansion of self-determination helped 49 provincial and prefectural state farms in Hubei realized a profit for the first time last year. Self-determination, in this case, include the choosing of crops and livestocks by individual state farms to suit local conditions, the use of labor and funds, and the management of materials. One production team of a farm operated in the red for 10 years because the authorities wanted it to grow grain crops on its sandy land. Last year, it raised pigs instead of crops and made 120,000 yuan in one single year. The grain output of 46 of these farms rose 6.5 percent and their cotton, oilseed and pig production was up by more than 19 percent last year as compared with 1978. [Beijing RENMIN RIBAO in Chinese 24 Jan 80 p 1]

HUNAN

BRIEFS

HUNAN FOREST AREAS' RATIONS--The Hunan Provincial CCP Committee has decided to allot 100 million jin of grain to specially solve the commune members' ration problem in the forest areas. The provincial forestry bureau and the provincial grain bureau recently issued a joint circular demanding that all places use this grain for the communes and brigades in the forest areas where there are more mountainous areas and forests and less arable land. [Changsha Hunan Provincial Service in Mandarin 2315 GMT 8 Feb 80 HK]

HUNAN SPRING FARMING--According to the departments concerned, output of chemical fertilizer in early 1980 increased by 20 percent over the corresponding period of 1979, while plant chemicals increased by 42 percent and plant chemical equipments increased by 35 percent. Supply of all agricultural tools and parts can meet all demands with better quality and lower costs, providing the essential conditions for meeting the busy season of spring farming. In January 1980, production of chemical fertilizer increased by 42 percent over the corresponding period of 1979, while the output of plant chemicals increased by 250 percent. [HK260220 Nanchang Jiangxi Provincial Service in Mandarin 1100 GMT 14 Feb 80 HK]

HUNAN COUNTY HOG RAISING--Changsha, 21 Feo--Changsha County in Hunan raised some 954,300 hogs in 1979, averaging 1.38 head per person. In the same year, some 295,800 hogs were sold to the state. [Beijing XINHUA Domestic Service in Chinese 0238 GMT 21 Feb 80 OW]

CSO: 4007

JIANGSU

BRIEFS

HIGH YIELD FROM EXPERIMENTAL PLOT--Researcher Chen Yong-kang of Jiangsu's Institute of Agricultural Science experimented with high-yield double cropping of rice and wheat last year and achieved an average yield of 2,320 jin and 7 liang per mu, an increase of 260 jin and 7 liang over his 1978 achievement of 2,060 jin, thus setting a new record in his experiment. [Text] [Beijing RENMIN RIBAO in Chinese 20 Feb 80 p 1]

JIANGSU COTTON PRODUCTION MEETING--In order to reap a bumper harvest of cotton in 1980, the Jiangsu Provincial CCP Committee and the Jiangsu provincial people's government have made a decision to invite over 6,500 representatives of advanced cotton-producing units to visit and study in Nanjing. At present, departments concerned of the province and municipality are making preparations to accommodate the representatives. [Nanjing Jiangsu Provincial Service in Mandarin 2300 GMT 22 Feb 80 OW]

JIANGSU AFFORESTATION DRIVE--The Jiangsu provincial people's government recently issued an emergency circular calling on all localities to step up tree planting and afforestation activities. The circular noted that efforts should be made to develop forestry in the drive to realize the four modernizations. [Nanjing Jiangsu Provincial Service in Mandarin 2300 GMT 20 Feb 80 OW]

JIANGSU AGRICULTURAL PRODUCTION--The Jiangsu Provincial CCP Committee and the Jiangsu provincial people's government recently organized 90 cadres at the provincial level to assist party committees and local governments in various places in implementing agricultural production tasks. Responsible comrades of the provincial CCP committee and the provincial people's government, including Zhou Ze and Chen Ketian, held talks with some of the cadres before their departure for the seven prefectures and Nanjing suburbs. Comrade Zhou Ze explained the guiding principle, tasks and methods of their mission to the cadres concerned. He stressed the importance of field management for summer crops, the expansion of acreage of spring rapeseed and spring wheat, the installation of equipment and facilities for water conservancy projects and spring afforestation work. [OW250910 Nanjing Jiangsu Provincial Service in Mandarin date and time not given]

JIANGSU SHEEP PRODUCTION--The amount of sheep in Jiangsu was 5.7 million head at the end of 1979, 210,000 head more than the record year of 1962. [Nanjing Jiangsu Provincial Service in Mandarin 1100 GMT 15 Feb 80 OW]

SUZHOU ECONOMIC GAINS--The average income of 6 million peasants in Suzhou Prefecture, Jiangsu, reached 157 yuan in 1979, 23 yuan more than in 1978. Total grain output of the prefecture exceeded 8.2 billion jin, with per-mu yield averaged 1,449 jin. Total cotton output was 887,000 dan, with per-mu yield averaged 127 jin. Total output value from various other economic undertakings was more than 360 million, a 41.7 percent over the previous year. Commune and brigade industry has been growing at 30 percent rate annually, with total output value last year hitting 2.43 billion yuan and profits 360 million yuan. Average food grain rationed in the prefecture was maintained at 630 jin. [Nanjing Jiangsu Provincial Service in Mandarin 2300 GMT 17 Feb 80 OW]

CSO: 4007

JIANGXI

BRIEFS

JIANGXI 1979 HARVEST--Jiangxi Province achieved an overall agricultural full harvest this year. The total grain crop yield over the entire province this year reached 24.7 billion jin, surpassing the historic record set last year by 2.2 billion jin, amounting to an increase of 9.7 percent. Compared with last year, the cotton production increased 25 percent; the oil production, 20 percent; the sugar cane production, 20 percent; the hemp production, 46 percent; tea leaf, 8 percent; fruits, 100 percent; and hogs, cattle, sheep, rabbits and fowls each had a different degree of increase. So far, procurement of agricultural products and byproducts made by the government including grain, cotton, oil, fowls, eggs, tea, and fruit has already surpassed that of the same period last year. The collective economic income of the entire province this year increased 25 percent or so over that of last year. The net average income of each commune member is expected to increase 20 yuan or so this year, which is the largest increase achieved in many years. [Text] [Beijing BEIJING RIBAO in Chinese 19 Dec 79 p 3] 9113

JIANGXI ECONOMIC CROPS CONFERENCE--The Jiangxi provincial people's government recently held a provincial conference in Nanchang on economic crops production. The conference studied and implemented this year's plans for cotton and other economic crops production and other future development plans and measures. Responsible comrades of six administrative offices and Nanchang Municipality who are in charge of agriculture, responsible people of agriculture, grain and marketing and supply departments and responsible comrades of all departments concerned attended the conference. (Liu Zhonghou), deputy secretary of the Jiangxi Provincial CCP Committee, and Zhang Guozhen, vice governor of Jiangxi, spoke. The conference stressed that Jiangxi must adequately plant 1.7 million mu of cotton and other economic crops this year. [Nanchang Jiangxi Provincial Service in Mandarin 1100 GMT 14 Feb 80 HK]

CSO: 4007

JILIN

BRIEFS

AGRICULTURAL PRODUCTION--Last year Changchun Municipality produced 166,000 tons of sugar beets, 8 million jin of various fruits, 210 dan of silkworm cocoons and 1,188 dan of herb medicines. This created a total revenue of 60 million yuan. [Changchun Jilin Provincial Service in Mandarin 2200 GMT 29 Jan 80 SK]

TIMBER PRODUCTION--Jilin Province overfulfilled the January timber production quota by 15.7 percent. An extra 50,780 cubic meters of timber were produced compared with the present target. [Changchun Jilin Provincial Service in Mandarin 1100 GMT 6 Feb 80 SK]

CSO: 4007

LIAONING

BRIEFS

LIAONING GRAIN, OIL PROCUREMENT--Liaoning Province has overfulfilled the government purchase tasks on agricultural products including grain, oil, cotton, and hemp this year. By 15 December, 6.37 billion jin of grain has been delivered to the warehouse, exceeding the quota by 870 million jin together with 127 million jin of oil and fat, exceeding the quota by 11 million jin. Cotton, blue hemp, red hemp, hemp and tobacco have also surpassed the quota by 0.38 to 72.7 percent, all satisfying the government plan.  
[Text] [Beijing BEIJING RIBAO in Chinese 23 Dec 79 p 4] 9113

LIAONING GRAIN PRODUCTION--Shenyang, 9 Feb--Despite natural disasters, Changtu County, Liaoning, scored marked achievements in grain production in 1979. The county's total grain output was 1.48 billion jin, or more than 71 million jin over 1978. The county turned over 705 million jin of marketable grain to the state, or more than 55 million jin over 1978, ranking second only to Yushu County, Jilin, and Xinghua County, Jiangsu. Its average per capita grain ration reached 525 jin, or 16 jin more than 1978; and its average per capita income was 115 yuan, or 19 yuan more than 1978. [Beijing XINHUA Domestic Service in Chinese 0220 GMT 9 Feb 80 OW]

CSO: 4007

NEI MONGGOL

BRIEFS

TIMBER PRODUCTION--Last year 5.38 million mu of land were afforested in Nei Monggol. This was more than the target set in the annual afforestation plan. The state forestry farms in this autonomous region produced 520,000 cubic meters of timber last year. Achievements were also made in multi-purpose utilization of timber. [Hohhot Nei Monggol Regional Service in Mandarin 1100 GMT 29 Jan 80 SK]

CSO: 4007

QINGHAI

BRIEFS

GRAIN PRODUCTION--Wulan County, Qinghai, has won bumper harvests in 1979. The total grain yield in the county amounted to 19 million jin and that of oil-bearing crops 480,000 jin in 1979, marking increases of 10 percent and 60 percent respectively as compared with those in 1978. [Xining Qinghai Provincial Service in Mandarin 1100 GMT 9 Feb 80]

DULAN COUNTY BUMPER HARVESTS--Dulan County, Qinghai, has won bumper harvests in 1979. The total grain yield in the county amounted to 25 million jin and that of oilbearing crops 690,000 jin in 1979, marking increases of 14 percent and 5 percent respectively as compared with those in 1978. [Xining Qinghai Provincial Service in Mandarin 1100 GMT 9 Feb 80 OW]

CSO: 4007

**SHAANXI**

**BRIEFS**

**COUNTY AFFORESTATION--Xian, 7 Feb--As of the end of 1979, Weinan County of Shaanxi Province had planted and preserved 42 million trees, thus afforesting over 90 percent of roads, canals and villages in the county. [Beijing XINHUA Domestic Service in Chinese 0718 GMT 7 Feb 80 OW]**

CSO: 4007

SHANDONG

BRIEFS

SHANDONG 1979 HARVEST--Shandong Province achieved an overall full harvest of its agricultural production this year. According to the statistics, the total grain production of the entire province this year increased 1.1 billion jin over that of last year; cotton, 120,000 dan; peanuts, 2 million dan; and dried fruits, 300 million jin. Production of hogs, sheep, chickens, and rabbits has also experienced significant increase. Besides these, other cash crops, local special products except for some individual products have also experienced increased production in general. By early December, more than 6.75 billion jin of grain over the entire province has already been delivered to the warehouse, accomplishing the government purchase task for this year with more than 1.5 billion jin to spare. The total agricultural income of the entire province, the collective savings of the communes and the production teams, the grain ration, and profit distributed to the commune members, have all increased compared with last year, while the production cost has seen some decrease. [Text] [Beijing BEIJING RIBAO in Chinese 23 Dec 79 p 4] 9113

SHANDONG CASTOR-OIL CIRCULAR--The Shandong provincial grain, agriculture and education bureaus and the provincial supply and marketing cooperative, the provincial CYL committee and the provincial women's federation recently issued a joint circular which calls for efforts to grow castor-oil plants to support the four modernizations and increase income. The circular urges every youngster of the province to try to reap six to seven liang of castor beans this year in order to accomplish the goal of reaping 100 million jin of castor beans set for young people throughout the country. [Jinan Shandong Provincial Service in Mandarin 2300 GMT 16 Feb 80 SK]

CSO: 4007

SHANGHAI

## SHANGHAI ACHIEVES BUMPER LATE RICE HARVEST

Shanghai WEN HUI BAO in Chinese 10 Dec 79 p 1

[Article by correspondents Fu Yiyuan [0265 0001 3293] and Wu Zhenxing [0702 2182 5281]: "The Spirit of the Third Plenary Session Mobilized the Enthusiasm of the Vast Majority of the Masses; The Shanghai Suburbs Achieve Bumper Late Rice Harvest; While the Planted Area Is on the Decline, the Total Annual Grain Yield Approaches the Full Harvest of Last Year"]

[Text] Following a significantly increased production of three wheats and early rice, the Shanghai suburbs achieved a bumper late rice harvest. According to a preliminary tally made by each county, the total annual grain crop yield of the entire suburbs could approach the full harvest of 1978 in spite of the fact that the total planted area was on the decline.

One of the outstanding characteristics of the bumper grain crop harvest achieved by the suburbs this year was the fact that the Song, Jin and Ching Counties where the area in which grain crops were planted was relatively large achieved an even greater increase in production on the foundation of the record-breaking production of last year. Chingpu County increased its yield by approximately 50 million jin; Jinshan County, approximately 30 million jin; and Songjiang County, approximately 20 million jin.

The shift of emphasis to agriculture made by each level of suburban leadership was a key factor for achieving the bumper grain crop harvest this year. Conscientious implementation of the spirit of the Third Plenary Session of the 11th Party Central Committee and the two documents concerning agricultural production published by the Party Central Committee provided a high driving force for the development of the suburban agricultural production. The leadership at the county as well as the commune level concentrated energy and exerted full force on solving agricultural problems and improving agricultural production. The Songjiang County party committee upheld the principle of doing according to what the actual circumstances dictate, steadily and positively implemented a reform of the cultivation system by expanding appropriately the area in which late rice was planted according to the local conditions. They have mastered the agricultural production, thus achieving a total annual grain crop yield surpassing the

historic record set last year. The Chingpu County party committee put emphasis on grasping the typical pattern in order to propel the whole system. They conducted a careful study of the factors causing low yield of grain crops over the years and recognized that low yield of late rice was the weak link. Thereupon, they have summarized and popularized the successful experiences of Zhengding Commune concerning late rice production. Under the adverse conditions experienced by the late rice, including attack by two typhoons and a cold temperature while ears of rice were forming, every commune and production team aggressively carried out measures to improve the production, and finally achieved it.

During the course of striving to achieve a full harvest, every county, commune and team of the Shanghai suburbs also paid close attention to mobilizing the enthusiasm of the masses by an application of the party economic policy. Eighty percent of the production teams of Shanghai County unfolded a movement called "knowing 1 year ahead of time," making a greater majority of the commune members understand the goal and direction clearly. At the same time, going one step further, they restored and strengthened the labor management system which is centered around a sound system of production responsibility, and unfolded labor contest. This year, the maturing period of both early and late rices has been pushed back, creating a tense seasonal situation with concentration of farm work, a situation that may be described as "three emergencies and three harvests." However, as a result of general implementation of fixed rate management, the labor effectiveness has been doubled, so that the absolute majority of the production teams could plant in time in spite of late harvest, thus was able to take the initiative to win a full harvest.

Striving continuously to discover the latent production power and to achieve steady and high yield in recent years, a great number of the communes and production teams in the Shanghai suburbs were able to practice scientific cultivation according to the natural law of growth and the climatic characteristics and bring about significant improvement in the yield per unit area. Fengxian County placed emphasis on water management of the early rice field. They transplanted in shallow water and allowed it to grow in deeper water. They also regulated water according to the growth rate and refrained from premature draining of the field toward the end of the season, thus achieving an average per mu early rice yield in excess of 900 jin. A large number of communes of many counties including Chingpu and Fengxian made proper adjustment of many counties including Chingpu and Fengxian made proper adjustment of the sowing density so that the seedlings grew healthy and strong and contributed significantly to increasing the production.

9113  
CSO: 4007

SICHUAN

BRIEFS

SICHUAN COUNTY PRODUCTION--Chengdu, 11 Feb--Guanghan County of Sichuan Province increased its total grain output by 5 percent in 1979, with per-mu output reaching 1,500 jin. The total income from agricultural and sideline production reached some 169 million yuan, increasing by 37 percent over 1978 with average income for each commune member reaching 158 yuan, an increase of 50 percent over that of 1978. [Beijing XINHUA Domestic Service in Chinese 0323 GMT 11 Feb 80 OW]

CSO: 4007

XINJIANG

BRIEFS

XINJIANG COUNTY OIL-BEARING CROPS--Baiching County of Xinjiang Uygur Autonomous Region actively promotes production of oil-bearing crops, with plans of growing 85,000 mu of rapeseeds basically completed. As of the end of January, manure has been applied to some 11,700 mu of rapeseeds. This county produced some 64.4 million jin of oilbearing crops in 1979. [Urumqi Xinjiang Regional Service in Mandarin 1300 GMT 22 Feb 80 OW]

FARM MACHINERY PLANTS--In 1979, 28 farm machinery plants under the Xinjiang regional farm reclamation bureau overfulfilled the annual output value plan by 20 percent and made a profit of 1.02 million yuan, thus achieving the goal of switching from losses to profits. [Urumqi Xinjiang Regional Service in Mandarin 1300 GMT 19 Feb 80 OW]

CSO: 4007

YUNNAN

BRIEFS

YUNNAN COUNTY CATTLE BREEDING--Funing County in Yunnan has made headway in cattle breeding since the beginning of 1979. As a result the county turned in and sold to the state a total of 7,200 head of cattle last year, thus overfulfilling its annual plan by 100 percent. [Beijing XINHUA Domestic Service in Chinese 0233 GMT 23 Feb 80 OW]

CSO: 4007

## ZHEJIANG

### ZHEJIANG 1979 WHEAT, BARLEY CROP ANALYZED

Hangzhou ZHEJIANG NONGYE KEXUE [ZHEJIANG AGRICULTURAL SCIENCES] in Chinese  
No 5, 1 Oct 79 pp 1-7

[Article by Office of Foodstuff Production, Zhejiang Provincial Office of Agriculture, and Institute of Crop Research, Zhejiang Provincial Academy of Agricultural Sciences: "A Summarization of Techniques for High-Yield Production of Wheat and Barley Used in 1979"]

[Text] In 1979, 8.491 million mu of land in this province produced wheat and barley, an increase of 698,700 mu over 1978. The average yield per mu was 346 jin, 22.6 percent above last year's figure, while the total yield was up 33.2 percent. Both the yield per mu and total yield are new records for this province. Provincewide, plains, mountains and hilly regions all had large areas producing rich harvests of spring grains. Hangzhou, Jiaxing [0857 5281] and Ningbo districts, together with 16 counties and cities including Jiaxing, Yuhang [1051 2635], Shaoxing and Yin [6769] counties had an average yield per mu of 400 jin or higher. On the basis of incomplete statistics, 99 communes had yields of 500 jin or more per mu for spring grains, 490 brigades surpassed the 600 jin per mu mark, and 707 production teams surpassed the 700 jin per mu mark; some 23,647 mu of land surpassed the yield per mu specified in the Agricultural Program this season. The emergence of these high-output units unquestionably will help our province to make broad and deep advances in spring grains and will provide precious experience.

Experience with techniques producing rich harvests of spring grains in 1979 is summarized below.

#### 1. Taking Advantage of Local Conditions, Effective Crop Distribution, Good Cultivation of Spring Grains

Widespread experience indicates that large-scale effective cultivation of spring grains not only led to a seasonal increase in productivity but also brought about rich harvests for the year as a whole. Surveys indicate that of the units which had foodstuff yields above 1,600 jin per mu, more than 50 percent of the land area was sown to spring grains; of those surpassing

2,000 jin per mu, spring grains accounted for 60-70 percent of the land area. A common feature of all these units is that the cultivation workload was light, fertilizer conditions were good, and basic agricultural construction was in relatively good condition. Units which meet these conditions should sow larger quantities of spring grains and can expect large yields. The Miaoerqiao [1181 0334 2890] Production Team of Gongdong [2162 2639] Brigade, Huangyan [7806 1484] County has a third of a li of grain land per person, the soil is rich and well fertilized, the fields are level and even, drainage is good and other natural conditions are also excellent. This brigade is actively pursuing the spring grain and rice triple-crop system, and in 1978 and 1979 its spring grain land area was 231 mu or 85 percent of the total area; the average yield per mu has surpassed 600 jin for both years and has led to many individual cases of high yields. Units which still do not meet the above conditions should take active steps to improve their situations and should make an effort to sow more and obtain high yields.

Another factor in effective disposition of plantings and the reaping of rich harvests year-round through sowing larger quantities is that of taking advantage of the biological characteristics of wheat and barley varieties and planting in the most suitable soil conditions. For example, in highly acidic soils, Zaoshu [tsao-shu 2483 3578] No 3 barley is subject o harm from the acidity, and in growth and yield it is far inferior to 908 wheat. Sheng [1522] County took advantage of this biological difference between wheat and barley by planting large quantities of wheat in mountainous and semi-mountainous regions with acidic soil of pH about 5, locating most of the barley in plains paddy areas where soil acidity was lower, with the result that yields were high for both wheat and barley. Chayuan [5420 0954] Brigade in Linjiang [5259 3068] Commune of this county is in a hilly area with soil pH of 5.1-5.3. In the past it planted only barley in the spring and yields per mu for a long time ranged between 100 and 200 jin. In the winter of 1978 they switched from barley to 908 wheat and the yield per mu increased to 400 jin. Comparing the 1978 and 1979 results for this brigade's No 4 production team, 908 wheat gave increases of 106 percent and 54 percent respectively over Zaoshu No 3 barley.

In effectively distributing spring grain plantings, account should also be taken of different cultivation systems and arrangements made for spring grain varieties with different growing seasons. In this province, relatively early-ripening 908 wheat is well established and the experimental variety Zhemai [Che-mai 3181 7796] No 2 is being actively disseminated in accordance with the three-harvest system. But in barley (or wheat) rice two-crop systems and in late-rice seedbeds used in intercropping, since the time constraint for the planting of early rice is absent, certain spring grain varieties with a somewhat longer growing season and a potential for higher yields can be included. Nanyang [0589 7122] Brigade of Liuliang [3966 5328] Commune, Tongxiang [2717 6743] County previously used the relatively early-ripening wheat variety Jiulan [chiu-lan 0046 5695] as its first crop in late-rice seedling beds, but in 1979 it decided to plant 372.6 mu of its total of 380.5 mu of late rice seedbed to Yangmai [Yang-mai 2254 7796] No 1, which has a relatively long growing season and a high

yield per mu. According to accounting figures from the brigade's No 7 production team, Yangmai No 1 gives an average yield per mu of 200.1 jin higher than Jiulan. As a result of this change in spring cropping alone, the entire brigade increased its yield of spring grain by 74,000 jin.

## 2. Strengthen Protection Against Water Damage, Improve Cultivation Quality, Upgrade Fertilizer Application and Cultivation, Strive to Produce More and Bigger Ears

If we make our analysis in terms of number of ears, number of grains and weight of grains as factors in yield per mu, for 1979 the effective number of ears increased over 1978 by 30,000-50,000 per mu for barley and wheat, and there was a certain increase in the number of full grains per ear. The weight per thousand grains of barley maintained the 1978 level or dropped 1-2 grams, while the empty grain rate decreased by 10 percent or more. The weight per thousand grains of wheat was slightly up from 1978. From the foregoing it can be seen that the increase in yield per mu of barley in 1979 resulted primarily from an increase in the effective number of ears and a decrease in the empty grain rate, while the increase in yield per mu of wheat resulted from an increase in the weight per thousand grains, with adequate earring. Accordingly, in order to obtain rich harvests of wheat and barley it is necessary to assure a certain number of ears per unit area and strive to increase the number of full grains and the grain weight. The experience of high-output units in all localities shows that certain steps must be taken to meet this requirement.

a. A full complement of irrigation canals and ditches. The main threat to high yields of wheat and barley in the Hangjiahu [2635 0857 3275], Ningbo and Wentai [3306 0669] plains areas with irrigation systems, which have large areas sown to the two grains, is a high underground water level. Particularly in years with large amounts of winter rain, prevention of water damage is extremely important in order to assure germination, earring and production of grains. Summation of past experience in preventing water damage indicates that maintenance of waterways and implementation of the "three canal" system prevents harm and gives high yields. In 1978 use of a combination of open drains, covered drains and mixed open and closed drains, and of open ditches and covered channels (anhe 2542 3109) was expanded. In the winter of 1978 and the spring of 1979, although rain was considerably less than in most years, digging of a set of drainage ditches still had a good effect on spring grain yields. Experiments with barley carried out by Hongxi [3163 3005] Brigade, Hongxi Commune, Jiashan [0857 6365] County, with relatively deep ditches measuring 50-54 centimeters the underground water level reached 91.5 cm, the dense root area was about 27 cm deep, and the yield per mu was 805.8 jin, whereas without these ditches the underground water level was 54 cm and the dense root level in the vicinity of 19 cm, with yield per mu amounting to only 547 jin.

In mountainous, semimountainous and hilly districts, the most important thing is removal of surface water and cold water from mountain pools and protection

against erosion. These areas should pay special attention to improvement of runoff ditches and protective trenches so as to guard against harm from cold water. Deep, narrow open drainage ditches should be cut in the fields and where suitable the surrounding ditches and straight ditches should be deepened.

Carrying out dry tilling and soil preparation, deep tilling of infertile tracts, and upgrading the degree of utilization of land are important factors in assuring germination and earing and increasing yields of spring grains in 1979. A survey by the agricultural office of Sheng County showed that in the past a large number of communes were practicing coarse cultivation with narrow beds and wide ditches, so that land utilization was generally about 60-70 percent. In the winter of 1978, before plowing, they absorbed outside experience, and in accordance with local conditions they carried out fine cultivation and changed over from narrow-bed-broad ditch cultivation to broad beds and deep, narrow ditches, so that the land utilization rate was above 80 percent, creating the conditions for an increased earing rate.

#### b. Timely sowing, improved sowing quality.

(1). As regards sowing time, experience shows that if sowing is a bit early the momentum is greater. In the experience of Xiayanggu [0007 3152 7357] Brigade, Wanglin [3769 2651] Commune, Huangyan [7806 1484] County, Zaoshu No 3 barley was sown on 10 and 20 November and produced relatively high yields, with the yield per mu 554.3 jin and 528.1 jin respectively, or 27 and 21 percent higher than the yield of 436.3 jin per mu for a later sowing on 25 November. Huanguang [5478 0342] Brigade, Liulian [3966 5328] Commune, Tongxiang [17 6743] County has experimental results on the sowing of Zaoshu No 3 barley indicating that 10 October and 25 November are the earliest and latest dates for sowing and produced the lowest yields, both being 633 jin per mu, or 42.5 to 76.3 jin per mu below the yields for sowings on 5, 10 and 15 November. Widespread experience gives the proper sowing dates for barley and wheat under ordinary conditions shown in Table 1.

Table 1. Proper Dates for Sowing Wheat and Barley Under Ordinary Conditions

表1 各地区大、小麦一般情况下的播种适期

谷物名称 a	各地区播种适期(月/日) b			
	杭州、嘉兴 c	宁波、绍兴、舟山 d	金华、丽水 e	温州、台州 f
大麦 g	11/5—15	11/5—20	11/中旬	11/15—25
小麦 h	10/25—11/5	10/底—11/初	11/上、中旬	11/10—15

注：部分高寒山区不在此类范围以内。

- KEY:  
 a. Grain  
 b. Suitable sowing date for locality (month/day)  
 c. Hangzhou, Jiaxing

- d. Ningbo, Shaoxing, Zhoushan
- e. Jinhua, Lishui
- f. Wenzhou, Taishou
- g. Barley
- h. Wheat

Note: These dates do not apply to some high-altitude, cold mountain areas.

(2) Quantity of seed sown. In general, the quantity of winter wheat and barley sown was lower than in previous years. The main reason was that the seed quality was better, and there were exceedingly few rainy days and the air temperature was rather high during sowing, so that dry tilling and preparation could be carried out and conditions were favorable to germination and increased the germination rate; the fertilization level was increased, the amount of base fertilizer was more adequate, which led to early production of vigorous seedlings; the area sown to hybrid paddy rice was increased, which was favorable for crop rotation arrangements, making possible a suitable early sowing period. With these favorable conditions, the quantity of seed sown was excessively large and sometimes it resulted in an excessive number of seedlings which had overlapping leaves and were weak at the base, so that they were subject to lodging. Accordingly, the various localities suitably decreased the amount of seed sown. The proper quantities for wheat and barley sown at the suitable time using different sowing methods in various localities during 1979 are shown in Table 2 on the basis of statistics.

Table 2. Proper Quantities of Barley and Wheat Seed for Different Localities and Sowing Methods

表2 不同播种方式下各地大、小麦比较适宜的播种量

作物名称 a	播种方式 b	每亩播种量(斤)c				
		杭州、嘉兴 d	宁波、绍兴、舟山 e	金华 f	衢州、台州 g	
大麦(早熟3号) h	撒播j	25—30	20—30	15	20—25	
	条播k	20—25	20—25	18	18—20	
小麦(908) i	撒播j	20—25	20—25	15—20	15—18	
	条播k	15—20	15—20	10—15	13—15	

- KEY:
- a. Grain
  - b. Sowing method
  - c. Amount sown per mu (jin)
  - d. Hangzhou, Jiaxing
  - e. Ningbo, Shaoxing, Zhoushan
  - f. Jinhua, lishui
  - g. Wenzhou, Taizhou
  - h. Barley (Zaoshu No 3)
  - i. Wheat (908)
  - j. Broadcast
  - k. Strip

(3) Method of sowing. Experience shows that the choice of broadcast sowing, strip sowing or dense dibble seeding should be made in terms of soil quality

and moisture content, fertility, quantity of weeds present and other local conditions. But no matter what method is used, a certain basic number of seedlings must be assured so as to make full use of water, fertilizer, air, temperature and light conditions and bring the full production potential of the seed into play. Starting this year some units have even instituted transplantation of wheat seedlings, with good results in terms of yield.

c. Grasping the use of proper quantities of fertilizer, and scientific use of it. Statistics on 28 high-production plots in Wenling [3306 1545] County indicate that every dan [50 kg] of standard fertilizer produced 8.8 jin of grain. But the range of variation is large: at the highest, each dan produced 15.6 jin of grain, and at the lowest only 5.2 jin. This shows that a grasp of proper fertilizer amounts and scientific application of it can result in high and stable yields and low expenditures.

Preliminary statistics indicate that the yield of 500-600 jin per mu of wheat and barley requires about 60 dan of standard fertilizer. The application principles are the "three points for concentration": concentrate on base fertilizer, concentrate on organic fertilizer, concentrate on fertilizer from that year. As regards application techniques, under ordinary conditions the principles are: adequate base fertilizer, rapid fertilizing of seedlings, heavy midwinter fertilizer [lafei 5198 5142], and skillful application of spring fertilizer. In layered use of base fertilizer, the bottom, middle and surface layers should have uniform quantities of fertilizer so as to promote growth of vigorous seedlings with deep roots and lay the foundation for a rich harvest. In the case of late-sown or weak and few-eared seedlings, the seedling fertilizer and midwinter fertilizer should be applied early. The tillering of barley is earlier than that of wheat, so that the midwinter fertilizing should be earlier. In 1978, Xiayanggu Brigade, Huangyan County sowed 256 mu with wheat and barley, and applied an average of 60-65 dan of standard fertilizer per mu. Base fertilizer was 65 percent of this quantity, and dressing 35 percent (stalk fertilizer about 15 percent, tillering fertilizer about 10 percent and midwinter fertilizer about 10 percent). Of the total quantity of fertilizer, organic fertilizer accounted for 58-61.5 percent. There was also an increase in application of phosphate and potassium fertilizers. Because the application of fertilizer was appropriate, there have been repeated good harvests and insect damage has been light, the entire brigade has had uniformly high yields, and the average yield per mu has reached 609 jin.

On high-production plots with yields of 700-800 jin per mu, attention should be paid to appropriate planting density and control of colonies. To meet this requirement, in addition to decreasing the quantity of seed sown, stress should be placed on controlling the total quantity of fertilizer used and improving application techniques. A survey of a typical area of an experimental high-production plot sown to zaoshu No 3 barley in Wenling County indicated that the proper total quantity of fertilizer was about 70 dan per mu.

In 1979 this province had a good many high-yield plots and locations whose wheat and barley were subject to lodging. There are a good many reasons for this, but incorrect application of fertilizer is a primary one. Surveys by Huangyan, Wenling and provincial agricultural colleges' high-production experimental cooperative centers indicate that generally the principle of "sufficient base fertilizer, early seedling fertilizer, heavy midwinter fertilizer, skillful spring fertilizer" is used in fertilizer application, and when the level of fertilizer application is relatively high the use of these uniformly stimulative fertilizer application methods leads instead to excessively large colonies and to lodging. For example, on its small-scale farming plot No 28, Huanguang Brigade, Tongxiang County conducted experiments on high-yield barley production; sowing was on 16 November, and a total of 61.5 dan of standard fertilizer was applied per mu, with a basic number of 216,000 seedlings. The distribution of fertilizer over the growth period was: 22.5 dan of base fertilizer (36.4 percent); 31 dan of pig manure and urine, 25 dan of human urine, 25 jin of ammonium bicarbonate and 27 dan of pig manure and urine (equivalent to a total of 39 dan of standard fertilizer) were applied on 12 and 25 December and 21 January [as published], with the total number of ears rising rapidly in the 20 days between 19 January and 9 February to 568,000; between elongation and booting, the leaf area coefficient rose from 4.542 to 10.481. Because the colony was too large, 7 days after earing [qisui 7871 4482] the lodging area climbed to 35 percent, and on 23 April it totaled 80 percent, with the yield per mu amounting to only 520.4 jin.

In 1979, this province also had a good many high-yield plots which suffered lodging because of utilization of the principle of "stimulate before winter, control when wintering over, appropriate fertilization during stem extension and booting." Stimulation before winter means in particular the application of sufficient base fertilizer and early application of stalk fertilizer to produce a sufficient number of strong seedlings. Control during wintering over means primarily decreasing the quantity of midwinter fertilizer so as to control spring tillering and the production of leaves in the middle stage, to increase the rate of earing and to encourage strong stalks and large ears. Appropriate fertilization during stem extension and booting entails an increase in the "sword-leaf" area, extension of the period of effectiveness of the leaves, increased photosynthetic capabilities, faster transport of matter, a decrease in small flower degeneration, increased fruiting rates, and increased grain weight. For example, the Jiaxing District Agricultural Office's 5.9-mu Zaoshu No 3 high-production experimental plot gave an average yield per mu of 747.2 jin (with 2.9 mu yielding 806.5 jin per mu) with the average quantity of standard fertilizer per mu being 5.5 dan, including 57 percent organic fertilizer, and with base fertilizer accounting for 76 percent and dressing for 24 percent, and earing fertilizer accounting for 18.4 percent of the dressing. Because the method of "stimulation before winter, control during wintering, appropriate fertilization during stem extension and booting" was used, the overall dynamic of the seedlings was relatively stable, and the number of ears, number of grains and grain weight were relatively well coordinated, there was no lodging during the entire growth period, and the goal of many ears, increased numbers of grains and increased eights were achieved

In addition, deep application of chemical fertilizer is an economically effective technique. Ammonium bicarbonate and ammonia water, which are easy to use, are especially important for deep application. When phosphate and calcium fertilizers are applied in increased quantities to wheat and barley, plains, mountain districts and hilly regions all have good production results. In particular, in recent years increased use of nitrogen fertilizers has been followed by a marked increase in the effectiveness of phosphate and potassium fertilizers.

d. Timely and appropriate rolling [qiao, 2418] of wheat and barley. The experience of various localities shows that timely and appropriate rolling makes it possible to control tall plants and stimulate low ones, stimulate the roots and increase ear length, resist cold and keep in heat, make stems strong and lodging-resistant, increase the effective number of ears and kernels, and thus produce high yields. Experiments by the Hangzhou Municipal Institute of Agricultural Science indicate that with sowing at the proper time and normal growth, early rolling (at the three-leaf stage) produced yields 8.3 percent higher than when no rolling was done; when the sowing was rather early, and when there was stem extension before year-end, even if rolling was done after stem extension there were still pronounced increases in yield. For example, Zaoshu No 3 barley was sown on 30 October, stem extended on 10 January, and was rolled when the first joint had extended to 1-3 cm; after rolling, 10 jin of urea was applied, and the yield per mu was 590 jin, 13.5 percent higher than the 528.6 jin per mu yield for barley that had not been rolled. Following rolling the seedlings were low, the space between the basis nodes relatively short, with even earing, decreased harm from cold, and the effective number of ears was increased (Table 3), resulting in high yields.

Table 3. Effect of Rolling and No Rolling On Yield of Zaoshu No 3 Barley

表3 耕麦与不耕麦对早熟3号大麦生育的影响

处 理 a	株 高 b (厘米)	基部节间长(厘米) c		冻 死 率 (%) f		有 效 粒 i (万/亩)
		第一 节 d	第二 节 e	植 束 死 率 g	主 垚 冻 死 率 h	
耕 麦 j	97.4	2.66	8.45	12.9	11.5	49.2
不 耕 麦 k	98.1	3.70	9.34	40.4	15.9	34.0

- KEY: a. Treatment  
 b. Plant height (cm)  
 c. Basal node length (cm)  
 d. First joint  
 e. Second joint  
 f. Rate of frost kill (%)  
 g. Frost kill of plant  
 h. Frost kill of main stalk  
 i. Effective number of ears (10,000/mu)  
 j. Rolled  
 k. Not Rolled

If rolling is practiced, no matter whether it is applied to plants sown at the proper time and of normal growth or to wheat sown rather early and stem

extended within the year, fertilizer ~~and~~ing should always be combined with it, otherwise the desired results will not be achieved, or decreased yields may even result. If fertilizer is not applied after rolling, cold damage may also be increased. In addition, the following factors must be given attention in combination with rolling: crops sown early with lush growth should be rolled heavily, while those with small numbers of relatively weak seedlings should be rolled lightly; if the weather has been rainy and the fields are sodden, if there is a hard freeze, and if frost has not melted or the dew has not dried, rolling should not be done, and in the case of normal stem extension it is not done either.

### 3. Proper Grasp of Cultivation in the Middle and Late Stages, Protection Against Water and Lodging, Increased Grain Weight

Increased cultivation of wheat and barley in the middle and late stages of growth is an important link in assuring a large number of ears, striving for heavy grains, and working for ever higher yields. Production experience shows that as a result of climatic and cultivation factors the kernel weight of wheat and barley varies widely. On the basis of statistics on the grain weight of Zaoshu No 3 barley grown during 1971-1979 by six units of Zhejiang Agricultural College and the Zhejiang Provincial Academy of Agricultural Sciences, during these 9 years the average weight of a thousand grains was above 40 grams in 1971 and 1974, while it was near 40 grams in 1972 and 1975, in the range from 34 to 37.5 grams in 1973, 1976, 1978 and 1979, and at 30 grams in 1977. The largest value was 47.5 grams and the lowest 28.5 grams, a difference of 19 grams. Even in a single year, the differences from unit to unit were large. For example, in 1974, when grain weight was relatively high, the maximum was 47.5 grams and the minimum 39.8 grams, a difference of 9.7 grams; in 1977, when grain weight was relatively low everywhere, the maximum weight per thousand grains was 37.9 grams and the minimum 28.5 grams, a difference of 9.4 grams. Although the growing season for wheat and barley was relatively sunny and dry in 1979, there were still considerable differences from locality to locality in weight per thousand grains. It has been determined for the various localities that the maximum weight per thousand grains is 47 grams and the minimum 34.7 grams, a difference of 9.3 grams. This means that in addition to agricultural factors (from year to year), the weight per thousand grains is also subject to cultivation effects (differences from unit to unit in a given year), so that there is still a good deal of potential for increasing yield per mu by increasing grain weight.

In order to achieve large numbers of ears and increase grain weight, in the middle and late stages of barley and wheat cultivation the principles of "two fertilizations" and "two protections" must be grasped. These are: skillful application of spring fertilizer, advocating foliage dressing, and protection against water and lodging.

a. Skillful application of spring fertilizer. Experiments show that between stem extension and flowering, the quantities of nutrients absorbed by wheat and barley are the following proportions of the amounts absorbed during the

entire growing season: 1/3 of nitrogen, 2/3 of phosphorus, 1/2 of potassium. Accordingly, additional spring fertilizer in the right quantities and at the right times (stem extension and booting fertilizer) can stimulate spring development, good balance, assure continued vigor and increase the earing rate and weight per thousand kernels. But this is the time at which the weather turns warm again, rainfall increases, and the fertilizer contained in the oil gradually has its effect, and it is also the time when wheat and barley extend between the first and second joints. If the application of spring fertilizer is not done correctly, lodging may result. This is the main reason that in 1979 some high-yield experimental fields experienced lodging and low yields. On the basis of experience in the Jiaxing district, the "three references" are necessary in applying spring fertilizer: first, with reference to the quantity of fertilizer applied in the previous period, second, with reference to the innate fertility of the soil, third with reference to the quality of seedling growth. Generally 10-15 jin of standard chemical fertilizer per mu (calculated as ammonium sulfate) is supplied to each mu of the land in question, with about 10 percent of the total quantity of fertilizer being about right.

The spring fertilizer is best applied early in the favorable period. A survey by the Sheng County Agricultural Office indicates that applications of spring fertilizer on 10 February, 17 February and 27 February produced yields per mu of 531 jin, 499 jin and 465 jin respectively. This proves that application of spring fertilizer early in the proper period gives higher yields. In cases where fertilizer application in the preceding period was fairly sufficient, winter development has been good and leaf color at the spring equinox relatively dark, it is in general unnecessary to apply spring fertilizer, although some fertilizer may be applied to increase vigor and promote uniformity.

b. Stress foliage dressing. As wheat and barley reach the last stage of development, the ability of the root mass to absorb fertilizer gradually weakens, and if foliage dressing is applied it is absorbed through the leaf surfaces and can improve plant nutrition and extend the period of leaf photosynthetic ability. In addition to nitrogen fertilizer (urea), phosphorus and potassium fertilizer may also be sprayed on the leaves and can stimulate the milky stage and increase grain weight. Because leaf dressing is rather effective, Shaoxing County has already utilized it over a large area for the last 2 years. For every mu, one jin of urea of 1.5-2 liang of potassium dihydrogen phosphate have been used as foliage dressing. The area in which it is in use is 80,000-90,000 mu, amounting to about 40 percent of the total area sown to wheat and barley. A survey made by the country agricultural office indicates that areas where this dressing is used have an increase in weight per thousand grains of about 2 grams, with yield per mu increasing by about 20-30 jin. Moreover, Guangchen [1639 7115] No 16 team of Gangzhong [3263 0022] Commune, Pinghu [1627 3275] County and eight observation points in Yin County indicate that the use of 2 liang of potassium dihydrogen phosphate in 100-120 jin of water, sprayed in late March or early April, produced an increase in weight per thousand grains of Zaoshu No 3 barley amounting to 0.76 grams, and an increase of 1.1 percent in the fruiting rate,

an increase in yield of 38.7 jin per mu, or 7.4 percent; for 908 wheat the increase in weight per thousand grains was 1.71 grams, the increase in fruiting rate 3.4 percent, the increase in yield per mu 71.6 jin or 11.8 percent.

c. Protection against water. At about the time of earing for wheat and barley, root absorptivity is most pronounced, and accordingly there must be relatively large amounts of air in the soil. If the soil is too moist, and there is insufficient air, this decreases root activity, resulting in early withering and hindering an increase in grain weight. If field moisture is too high, it can intensify development of scab and the damage done by it. Experience in various localities indicates that to protect against water damage in the middle and late stages of development of wheat and barley, in addition to the necessity of digging a set of ditches as described above, it is also necessary to stress the digging of enclosing ditches around wheat and barley fields which are adjacent to early rice seedling plots or paddies and to designate specific people as responsible for maintenance of the waterways, frequent checking after rainfall and timely dredging, so as to protect against wager damage.

d. Protection against lodging. During the approximately 40-50 days between earing and ripening, in fields where wheat or barley growth has been too rampant or it has not been properly tended, it can be attacked by heavy winds and rain, frequently resulting in lodging. Lodging generally has a severe effect on the milky stage, decreasing the grain weight. Lodging at too early a stage can also affect the fruiting rate and increase the withered kernel rate. According to a survey by the agricultural office of Yin County, wheat which lodged in the milky stage (19 April), the milky ripening stage (30 April) and the waxy stage (7 May) and the rates of empty or shriveled grains were 9.1 percent, 2.8 percent and 5.8 respectively and the weights per thousand grains 24.6 grams, 30 grams and 34.4 grams respectively. The empty kernel rate for plants that had not lodged was 2.0 percent and the weight per thousand grains was 38.4 grams. This shows that once the plant has lodged, there may be an increase in the empty grain rate and a decrease in the weight per thousand grains. The earlier the lodging, the greater the increase in the empty grain rate and the decrease in weight per thousand grains.

The factors affecting lodging are rather complex. Generally, if the quantity of seed sown is too large, if too much nitrogen fertilizer is applied, or if the fertilizer application technique is not correct, the result is luxuriant growth in the middle and late stages, excessive numbers of seedlings, and as a result stem extension of the basal joints, and weakening of lodging resistance; if wind or rain occurs, lodging is likely. The experience in Sheng County is that if the number of seedlings wintering over is more than 800,000 or a maximum of over a million, lodging is likely. If the number of seedlings wintering over is held to 500,000 to 600,000, lodging is generally not likely. Accordingly, guarding against lodging must begin with basics, and cultivation in the earlier stages must be well grasped. Spraying of cycocel [aizhuangsu 4253 1104 4790] in the middle

and late stages controls the growth of wheat and barley, making the upper leaves smaller, the basal joints shorter, the mechanical structure of the stem denser, the plant as a whole short and sturdy and light penetration conditions better, all of which strengthens the ability to resist lodging. According to experiments by the Hangzhou Municipal Agricultural Institute, using a cross between Zaohong [Tsao-hung 2483 4767] and Ning [1337] 701, when cycocel was sprayed in the amount of 0.3 jin, 0.5 jin and 1.0 jin per acre, the plant heights were respectively 93.1 cm, 93.7 cm and 92.8 cm as compared with 94.5 cm for unsprayed plants. The length of the second joint was 8.82 cm, 8.83 cm and 8.46 cm respectively, compared with 9.69 cm for unsprayed plants. This means that spraying with cycocel can decrease the height of the plants by 0.8-1.7 cm and the length of the second joint by 0.86-1.23 cm. The institute has also done experiments on the number of sprayings. The height of plants sprayed once was 95.3 cm and that of plants sprayed twice was 87.9 cm, compared with 103.6 cm for those not sprayed, which means that an increased number of applications can further decrease the height of the plants.

#### 4. Effective Insect Protection and Treatment and Proper Maintenance of Safe Growing Conditions Will Result in High Yields and Rich Harvests

In 1979 a relatively large number of spring grain insect pests appeared, and the area in which they appeared was also rather large. The most serious harm was done by armyworm, aphids and barley net blotch, in addition to barley huanghua yebing [7806 5363 0673 4016, literally "yellow flower leaf disease"] and stripe rust which appeared in certain localities. Wheat and barley scab were relatively mild in 1979, but in certain unprotected plots there were relatively serious infestations. Because the localities conscientiously implemented the crop protection policy of "concentrate on prevention and engage in comprehensive protection and treatment," fought against natural disasters and struggled for good harvests, strengthened prediction and forecasting, expanded the "two surveys and two determinations," did well in material supply, trained technical teams, struggled against all diseases and insect pests, and basically controlled armyworm, aphids, scab and similar pests, they assured the safety of the spring grain crops. In 1979 the following experience was gained in prevention and treatment of plant diseases and elimination of pests.

1. Involvement in prevention, good work in prevention and cure of scab. In 1979 the number of rainy days and the quantity of rain during the earing and flowering periods for wheat and barley were particularly small, and the air temperature was relatively low, which was not favorable to the development of scab, so that overall the number of diseased ears was 4-5 percent, similarly to 1974. But in some plots in certain areas the incidence of disease was still rather serious. On the basis of 1979 weather characteristics and accumulated experience in crop protection and treatment, south Zhejiang basically did no protection and treatment work dealing with barley scab, while north Zhejiang only treated about 30 percent of the planted area. Wheat was subjected everywhere to one protective treatment effort

during the beginning of the flowering stage, while a second effort was made over a small area. For the entire province, the wheat and barley area subjected to protection and treatment measures was approximately 60-70 percent of the total planted area. After spraying and protection work, damage from scab was basically controlled. A survey of Xinjiang [6580 3068] Commune, Haining [3189 1337] County indicates that when Yangmai No 1 was not treated, 19.3 percent of the ears showed disease, a disease index of 6.0; for treated areas the rate fell to 0.3 percent, a disease index of 0.1. In Qiukou [4428 0656] Brigade, Bingmen [1456 7024] Commune, Chun'an [3196 1344] County, No 908 wheat was given two protective treatments with thio-phosphate, resulting in a diseased ear rate of 5 percent and a disease index of 1.25; the diseased ear percentage was 49 percent and the disease index 16 for plants not given protection, so that the protection effectiveness was 92.0 percent. The protected areas had a weight per thousand grains 4 grams higher than the unprotected areas, and the yield per mu was 16.8 percent higher.

b. Conscientiously expand the "two surveys and two determinations," and surely, accurately and relentlessly destroy the armyworm. In 1979, armyworm was spread over a wide area and in large numbers, but unevenly. A survey of Xiangshan County indicated that of the total of 70,000 mu of barley and wheat in the country, about 10,000 mu had 20,000-30,000 armyworms per mu; while 3,000 mu had 200,000-300,000 armyworms per mu. At the same time, the egg masses hatched early, so that the proper time for prevention and treatment work was close to the usual one. Because considerable attention was paid to the "two surveys and two determinations" throughout the province, timely protective measures were applied to 3 million of the 3.5 million mu of wheat and barley in which the number of insects per mu reached the protection threshold (i.e., 86 percent of the area), so that the threat from the armyworm was largely eliminated. But some communes and brigades slackened their guard and did not carry out timely protective measures, with the result that unjustifiable losses occurred.

c. Concentrate on agricultural protection and treatment, carry out crop rotation, decrease the occurrence of disease and insect damage. Barley "yellow flower leaf disease" [huanghua yebing] is a new disease which has developed quickly in recent years and presents a great threat. Preliminary surveys indicate that it has already caused problems in 32 counties in the province. On the basis of data from seven districts, the afflicted area is 116,000 mu. In 1978, more than 400 mu was afflicted in the Qingzhu [7320 3795] farm, Ninghai County, while in 1979 the figure jumped to 1460 mu, 92.4 percent of the total area planted to barley in the farm, with 370 mu producing essentially no yield, 370 losing about 50 percent of their yield and the rest losing 10-20 percent. Barley stripe rust, net blotch and smut [7815 4482 4016] are also on the rise everywhere. Incomplete statistics indicate that about 10 percent of the wheat and barley acreage is subject to smut, while the area afflicted with stripe rust is even greater. Many units have taken agricultural treatment measures against these diseases with relatively good results. In 1978, Zeguo [3419 0948]

Farm, Wenling County has a total of 66 mu afflicted with barley "yellow flower leaf disease," 41 of them gravely affected and giving yields below 200 jin. In 1979 an initial 40.4 mu of seriously affected area was planted to rapeseed instead, yielding 255.7 jin per mu, while the other 0.7 mu were planted to Zaoshu No 3 barley and gave a yield of only 161 jin per mu. As a result of crop rotation, the figure of 66 mu affected in 1978 was decreased to 15.3 mu in 1979. In 1978, Dachen [2192 7115] Commune, Yiwu [5030 3527] County, had 500 mu afflicted with the disease, and in 1979 it planted the afflicted area to wheat, rape and green manure instead, with the result that in 1979 the afflicted area was only 140 mu, a decrease of three-fourths. In addition to changing crops, afflicted areas can be interfilled at the beginning of spring and nitrogen fertilizer applied heavily, to the extent of 30-40 jin of ammonium bicarbonate per mu, producing a clear improvement in growth, with some afflicted plots giving yields of 400 jin per mu. Units of the Provincial Agricultural Institute have determined that different barley varieties have different resistance to "yellow flower leaf disease," and Liuleng [liu-leng 0362 4462] barley and some local varieties are relatively highly resistant, while the high-yield varieties are less so. In the future, research on outbreaks of "yellow flower leaf disease" and methods of protecting against it must be intensified and resistant, high-yield varieties selected.

Cold soaking and exposure to sunlight of limewater treatment of the seeds are effective measures for protecting against smut and stripe rust. Before the winter sowing, Yin County carried out cold soaking and sunning or lime-water treatment of 70 percent of the wheat and barley seed, and in 1979 smut and stripe were largely controlled. Cold soaking and sunning and limewater treatment have already been disseminated and used for many years, and their results in protecting against the abovementioned diseases are very good. The localities must continue giving attention to their dissemination.

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ZHEJIANG 1979 RAPE CROP REVIEWED

Hangzhou ZHEJIANG NONGUE KEXUE [ZHEJIANG AGRICULTURAL SCIENCES] in Chinese  
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[Article by the Food Production Department of the Agricultural Bureau of  
Zhejiang Province and Crop Institute of the Zhejiang Academy of Agricultural  
Sciences]

[Text] 1. The Situation and Characteristics of Production

In 1979, our province's production of rapeseed increased further upon the foundation of the bumper harvest of 1978. The entire province had 2,756,400 mu of rape and an average per mu yield of 161 jin, an increase of 15 percent over that of 1978. Total yield was 4,429,200 dan, an increase of 20.1 percent which is a highest record in the province's history.

The bumper harvest of rapeseed in 1979 was characterized by the following: One was a large planting area. The entire province's area of rape was larger than the area of the previous year by 122,800 mu, the greatest area of rape planted since 1960. The second was a relatively balanced increase in yield over large areas. Whether in mountain regions, plains or coastal regions, increased yields were registered everywhere. The original high yielding regions, namely the plains of Hangzhou, Jianxing and Ningbo produced yields that broke the historical records in 1979 following the high yield foundations laid in 1978 when a balanced increase in yield over large areas broke historical records. The original low yielding prefectures of Wenzhou and Lishui also produced new levels of production in 1979. For example, in Wenzhou, the area of rape in 1979 increased by 47,000 mu over that in 1978. Per mu yield in 1979 increased 17.7 percent over that of 1978 and total yield increased by 40 percent. Preliminary statistics show 48 counties of the province broke their highest historical records in total yield. Of these, 22 counties produced 10-20 percent more than 1978 and 18 counties increased output more than 30 percent over 1978. At various places, counties with per mu yield surpassing 200 jin, and communes and brigades whose per mu yields surpassed 300 jin and production teams whose per mu yield surpassed 400 jin emerged. For example, Pinghu county which produced a per mu yield of over 200 jin in 1978, further increased its yield. In 1979, the county's 117,800 mu of rape produced an average per mu yield of 250 jin, an increase of 25.0 percent over

1978. More than 100 mu of rape of the superior varieties farm of this county produced an average per mu yield of 351 jin, an increase of 14 percent over 1978. The Xinghua Brigade of the Quankuang Commune produced 21.7 percent more in per mu yield compared to 1978. The Shengdian No 2 brigade of the Qiuyi Commune of Yin County produced an average per mu yield of 324 jin from its 20.7 mu of rape.

The continued increasing yield of rapeseed in 1979 led people to further liberate their thoughts and widen their views. It also allowed us to further recognize that: (1) Rape is a high yielding crop with a wide range of adaptability, and its potential for increased production is great. (2) Bumper harvests of rape can elevate the consumption of edible oil by the people of our province's towns and villages. (3) Developing production of rape and developing production of food are consistent and mutually complementary. (4) There are many benefits from developing the production of rape. The experience of Pinghu County shows developing production of rape yields four major benefits: One is the abundance of cake fertilizers. The entire county harvested 28,090,000 jin of rapeseed and produced 15,450,000 jin of cake fertilizer. If each mu of paddy rice uses 100 jin of cake fertilizer, this solves 36.3 percent of paddy rice's need for fertilizers. The second is a high economic value. In 1979, the average production value of rapeseed per mu throughout the county was 85.68 yuan (calculated at parity). Just this income alone averaged 24.7 yuan per capita for the entire county. The third is a big contribution to the state. In 1979, each commune member was able to keep a sufficient amount of edible oil, and each person in the county was able to sell to the state an average of 63.4 jin of rapeseed. The fourth is that planting rape strengthens soil fertility and improves the soil which is beneficial for high yields for crops such as rice.

## 2. Experiences of Using Major Techniques

In 1979, the causes that brought about a continued increase in yield included the conscientious implementation of the spirit of the Third Plenum of the 11th Party Congress and the two important documents on rapidly developing agriculture issued by the Chinese Communist Party Central Committee at various localities, strengthening of the leadership in the production of rape, implementation of the policy of production of edible oils, mobilization of the enthusiasm of the masses of commune members to expand the planting of rape, favorable weather conditions, and the following four outstanding experiences in the use of cultivation techniques:

(1) Do what the local circumstances dictate and select superior varieties. By selecting and using superior varieties the potential of increased rape yields can be fully developed and the output can be raised. In 1978, over 700,000 mu of baicai [Chinese cabbage] type rape throughout the province produced a very low yield because of the lengthy period of dryness and scarcity of rain in winter and spring and the seriousness of diseases and the abundance of insects. This caused concern at various localities. For the crop planted in the winter of 1978, the method of "limiting the planting of the two late maturing varieties and grasping the intermediate maturing varieties" was used. It involved limiting the planting of the ganlan [wild

cabbage] type rape and especially the late maturing ganlan-type varieties and expanding the planting of early and intermediate maturing ganlan-type rape varieties. The increase in yield was remarkable and established the foundation for the bumper harvest in 1979. According to statistics compiled in the counties of Pinghu, Jiashan, Yuhang, Shaoxing Yin, Suichang, the area of ganlan-type rape rose from 73.8 percent in 1978 to 84.7 percent and per mu yield rose from 169.3 jin in 1978 to 187.8 jin, a 10.9 percent increase in yield. In 1979, 128,500 mu of rape were harvested in Yuhang county. Of the total, 76,500 mu of rape were ganlan-type with an average per mu yield of 250 jin. The per mu yield of the 52,000 mu of baicai-type rape was only 150 jin. The yield of ganlan-type rape crop was 66.7 percent more than the yield of the baicai-type rape crop.

The planting system in our province is rather complicated. The climate and the texture of the soil are different. Selective use of the ganlan-type superior varieties must suit local circumstances so that the effect of increasing yield by the superior varieties can be developed fully. The experience in Pinghu county was to selectively use and plant the 92 rape variety that grows better in winter and 408 and 70-41 early and intermediate-maturing varieties along the coastal paddy rice and cotton regions where the soil texture is loose and the task of working the soil is easier. In purely paddy rice regions, the soil texture is heavy, the task of working the soil is a major one and the seasons are tight. Here, except for combining some early and intermediate maturing varieties, the major varieties selected and used should be intermediate and late maturing varieties such as Dongshen 14 which have a more flexible seedling age. These varieties can be relied on to be strong through the winter and produce high yields in the spring so that overall, balanced high and stable yields can be achieved by the rape crops throughout the county. In addition to the active propagation of 92 rape as the major variety throughout the province, new ganlan-type varieties suitable to the locality are being introduced and propagated according to the soil texture of the locality, climate and the preceding crops and the following crops. The four counties of Jiashan, Pinghu, Shaoxing and Suichang propagated the new "480" rape variety selectively cultivated by the provincial Academy of Agricultural Sciences in the winter of 1978 and planted it over 103,000 mu. The 92-13 line was propagated in Yin County and the "3063" variety was selected and used in Lanxi county. Both produced visible increases in yields.

In winter of 1978, the hybrid variety of the incompatible line of self-crossed ganlon-type rape was test planted at various localities. Superior growth during the seedling stage was manifested clearly. The roots were prosperous, the plant type was clustered, there were many branches, single plants produced many pods, the thousand grain weight was heavy, and the yield was increased in multiples over the yield of the baicai-type rape. The yield of the hybrid variety approached the yield of the indigenous ganlan-type variety or surpassed it slightly. According to the results of test planting by the Huizeli, Zhanjia, Qianyou and Xiajingyan brigades in Qu County, the

hybrid variety "211 x 75-53" planted on 20.5 mu yields an average per mu yield of 202.4 jin, a 14.5 percent increase over the per mu yield of 176.1 jin of Zaofeng No 1, and matured 5 to 9 days earlier. According to surveys conducted by 19 units of the Wenzhou Municipality's Bureau of Agriculture, the hybrid variety "211 x 75-53" planted on 25.1 mu yielded a per mu yield of 203.1 jin. Xiuyou No 1 and Xiuyou No 2 totalled 154.44 mu and yielded an average per mu yield of 176.5 jin. The indigenous variety of rape planted on 300.78 mu produced an average per mu yield of 86.5 jin. The hybrid rape produced 15.1 percent more than Xiuyou No 1 and 134.7 percent more than indigenous rape. However, hybrid rape is a stronger vernal crop, its seedling age is less flexible and its resistance to viral disease is weak, thus it must be sown appropriately late and sown sparsely, transplanted early at an early seedling age, and special attention must be paid to the prevention of aphids.

The ganlan-type rape is a frequently crossbred crop. It is easily hybridized by natural hybridization. In many areas, cultivation and propagation of superior varieties are emphasized. In Pinghu, Jiashan, Haiyan and Lishui counties, where the new "480" variety of rape has been quarantined for reproduction, purity and increased productivity of the superior varieties have been elevated. The reproduction coefficient of rape is high. The amount of seeds needed is small, and the task of unified supply of seeds is more easily accomplished. The superior rape variety planted in Yiwu county was reproduced by the superior seed farm of the county with all seeds being uniformly supplied by the county. The results were good.

(2) Grasp Healthy Seedlings, Establish the Foundation. "Healthy seedlings assures 30 percent of the harvest, thin, poor seedlings portend half will be lost." "If the six leaves at the lower leg are uniform, a good foundation is established for bumper harvest." These sayings vividly describe the importance of healthy seedlings. The practice of high yield units has shown that healthy seedlings assure a quick revival after transplanting. The root system will prosper, there will be an abundance of green leaves, plenty of nutrients will accumulate, and the increase in production will be obvious. In general, healthy seedlings will produce an increased yield of 20 to 30 percent over thin, poor seedlings. Healthy seedlings are even more important to rape crops planted in late rice fields.

The standard manifestations of healthy rape seedlings cultivated by high yield units are: presence of 5 to 6 green leaves, thick roots, plenty of fibrous roots, no leggy plants, dark green leaves, and short, strong seedlings that are not diseased or affected by insects. There are two major techniques to cultivate healthy seedlings fully and well:

(1) The area for seedbeds must be sufficient. High yielding units generally have a seedbed to large field ratio of 1:5-6. For plants with a seedlings age not surpassing 35 days, the seedbed to large field ratio can be 16-8. According to surveys made by the 7 units of Jiashan County Superior Seed Farm,

the Yuhang League Brigade, Pinghu Xinghua Brigade, the Yin County Huizeli Brigade, the Yin County Anren Farm and the Yiwu County Superior Seed Farm, the seedbed to large field ratios were all between 1:5 and 1:7, and the per mu yield were all stably above 200 jin. Pinghu County produced higher and more stable yields. One of the very important experiences was that sufficient areas were left as seedbeds for cultivating healthy seedlings fully and well. This county planted 117,800 mu of rape. In winter of 1978, the area of seedbeds sown covered 16,300 mu, a seedbed to large field ratio of 1:7. Their method was first to arrange the special seedbeds during the preceding and second to fully utilize cotton fields, sweet potato fields and watermelon fields since these crops mature earlier. Preparatory seedlings were also cultivated before hand in patches of land along river banks and near seaports to assure a definite planting area for rape.

(2) Timely sowing and strengthening of management. Each locality basically sowed the winter sown crop of 1978 timely according to the characteristics of different varieties and different preceding crops. In areas of northern Zhejiang, the ganlan-type early and intermediate maturing varieties are generally sown in the first ten days of October and cultivated to a seedling age of between 35 and 40 days. Late maturing varieties are sown at the end of September and cultivated to a seedling age of about 45 days. In the southern areas of Zhejiang, sowing is generally 7 to 10 days later than the northern areas. Directly sown rape is sown during the middle and last ten days of October. Usually 8 liang to 1.5 jin of seeds are sown in each mu. Prior to sowing, the seeds are selected and dried, the field is finely prepared, sufficient base manure is applied, and a person is assigned the responsibility of sowing definite amounts of seeds in the small separated plots in the fields.

Management must be done conscientiously to assure healthy seedlings. In 1978, management of the seedbeds emphasized frequent irrigation and fertilization and the work of protecting the seedlings against dryness and controlling of insect pests and diseases, because during the year's seedling cultivation period, rainfall was scarce and the weather was dry. In areas where boron was deficient, boron fertilizer was sprayed. At the same time, thinning and final singling of seedlings were done in time and well. Initial fertilizers to stimulate growth were applied 5 to 7 days before transplanting.

(3) Preserve the entire seedling and stimulate strong growth in winter. The seasons must be grasped, the quality of transplanting elevated and management begun early and done carefully to assure the whole seedling is preserved. This is the basis for high yields of rape. Experiences of high yield units show rape needs 40 to 50 days or more of vegetative growth from the time of transplanting to the time before wintering to enable the plants to have 8 to 10 green leaves for overwintering. Each locality was able to reasonably arrange the crop openings in the winter planting of 1978. Seeds were sown at different times and in batches, plants were transplanted in rows and in time, thus changing the past habit of missing the time for planting spring crops

because rape was planted at the wrong time. Planters made sure that the planting of grain and rape were on time. In general, transplanting was accomplished before the end of November, and 3 to 5 days earlier than the time of winter planting in 1977. In Yin County after learning the lesson of several years ago that the early sowing of early maturing barley No 3 did not produce high yields, the method of planting rape first and then sowing barley has been used for the past two years achieving bumper harvests of both grain and rape. By November 20, 99.2 percent of this county's 72,400 mu of rape was already planted. By around November 22, transplanting was completed. In 1979, a balanced increase in yield of rapeseed was achieved. The average per mu yield throughout the entire county surpassed 200 jin, an increase of 17 percent over that of 1978. Along with seizing the season, each area also considered the local circumstances and planted the plants reasonably densely, generally transplanting between 8,000 to 11,000 plants in each mu. The method of transplanting was wide and narrow row strip planting and transplanting in equal row distances. At transplanting time, the fields were generally well fertilized with base manure, and supplementary phosphorus fertilizers were applied. At the same time, rape seedlings were selected in batches. The large ones were picked and the small ones were left. Then they were transplanted according to grades. They were irrigated as they were transplanted to assure even growth and growth of the whole seedlings.

On the basis of the whole seedling, management of cultivation was tightly grasped before the end of the year so that the rape was able to be healthy and develop in winter (in the southern regions), and to create conditions for development stable growth in spring. Actual measures consisted of first, an early application of fertilizers for the seedlings, second, heavy application of fertilizers for the waxy stage, third, interrow tilling and banking of the soil and packing the roots to prevent lodging.

Rape is especially sensitive to phosphorus fertilizers. Increasing the application of phosphorus fertilizers can stimulate prosperous rooting and growth of leaves, and increase the growth of branches and the number of pods, resulting in outstanding yield increases. According to experiments conducted at the An Ren Farm in Yin County, the per mu yield of each mu after applying 40 jin of calcium phosphate was 214.4 jin. Per mu yield of each mu after applying 40 jin of calcium-magnesium-phosphorus fertilizers was 221.5 jin. Compared to the per mu yield of 146.8 jin for plots not fertilized with phosphorus fertilizers, the increases were 44 percent and 50.9 percent. According to experiments of the Zhejiang Agricultural University, increased application of phosphorus fertilizers will not only increase yield, it will also raise the oil content. The rapeseed produced by one mu of land fertilized with 60 jin of phosphorus fertilizers have a 2 percent higher content of oil. Because phosphorus is not very mobile in the soil, better results can be obtained by applying it in concentration at the roots of the rape plants.

(4) Development and stable growth in spring assures bumper harvests. After February 5, the temperatures gradually rise and rape enters its peak vegetative and reproductive growth periods. At this time, the surface area of the leaves continue to grow and differentiation of flowers and buds is fast. A

large amount of nutrients is needed. Therefore, strengthening management in the spring is the key for early development and stable growth of rape to prevent early withering and for striving for high yields of rape. In 1979, each area grasped the following three points:

(1) Increase the application of fertilizers for the third and last stage of the stem's growth\* and skillfully apply fertilizers for flowering. Practice proves that application of fertilizers to stimulate growth of third stage of the stem is an important measure to assure development and stable growth in spring, prevent early withering of rape, increase the growth of branches, increase the number of pods and increase the number of seeds. According to experiments conducted by the Weixing Brigade of Pinghu County, increasing the application of fertilizers to stimulate growth of the third stage of the stem will enable the rape plant to grow 0.4 more branches, increase the number of effective pods of the entire plant by 152, the number of seeds per pod by 0.4 seeds, the weight of thousand seeds by 0.4 grams and enable the per mu yield to reach 325 jin, an increase in yield of 25 percent compared to the control plants. Lishui County's Institute of Agricultural Sciences applied 15 jin of urea per mu on February 15. This produced an average per mu yield of 255.2 jin, an increase in yield of 19.9 percent compared to the control plants. One of the important reasons for the continued high yield of rape in 1979 was the application of 15 dan of human feces and urine or between 25 and 30 jin of chemical fertilizers per mu as fertilizers for the growth of third stage of the stem when buds emerge and another application of such fertilizers of certain amounts determined by the conditions of the seedlings when the mossy pubescence grows to between 4 and 6 cun. In addition, definite results were obtained by each locality in spraying small amounts of phosphorus-potassium fertilizers at the beginning of the flowering period of rape to prevent early withering and full growth of the pods.

(2) Spraying of boron fertilizers. Boron is a microelement necessary to higher level plants. Dicotyledons require more boron than monocotyledons. Thus rape does not grow well in soils deficient in boron and easily "grows flowery but not solidly." Up to the present, our province has 8 prefectures (municipalities), and over 30 counties which have suffered from this physiological disease. A less serious deficiency causes a reduced yield of 20 percent to 30 percent. A serious deficiency causes a reduced yield of over 50 percent and even no harvest. This happens most seriously in years when the amount of rainfall is scarce and the weather is dry. Practices over the past several years show this kind of physiological disease can be effectively cured by the appropriate application of boron fertilizers and the yield will increase in multiples. According to the 32 experiments conducted in the 9 counties of Suichang, Lishui, Yunhe, Yin, Lanxi, Xianju, Genghua and Sheng, the per mu yield of fields sprayed with boron was 170.6 jin, compared to 80 jin of the control fields; this registered an increase of 90.6 jin, or a 113.3 percent increase. Since the winter planting in 1978, all localities have placed a lot of emphasis on the spraying of boron to prevent rape from

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\* [Translator's note: This stage is characterized by shorter distances between the leaf nodes and by narrower and shorter leaves.]

"growing flowery but not solidly." Generally, boron is sprayed once during the seedling period and once during the period of growth of the third stage of the stem. Each time, 1 to 2 large liang of sodium borate is mixed in 100 to 150 jin of water as a spray. Thus, rape crops seldom grew "flowery and not solidly" in 1979 although the weather was continuously dry since winter of 1978. This is also one of the main reasons for the continued and balanced increases in yield of rapeseed in our province.

(3) Prevention of diseases and insects to achieve bumper yields and bumper harvests. In 1978-1979, three diseases and one type of insect inflicted relatively serious damage on the rape crops. The diseases were caused by toxins, sclerotinia rot and downy mildew and the insect was aphids. The winter of 1978 was dry and aphids grew in large numbers. Disease caused by toxins was especially serious and the threat to baihai type rape was great. Many communes and brigades assigned special people to take charge of inspection beginning from the time of cultivating the seedlings. During the seedling period and the period of growth of the third stage of the stem, chemicals were sprayed 3 to 4 times. The population of the insects was reduced as well as the damage. Conscientious implementation of the policy of "taking prevention as the key" and grasping agricultural prevention tightly were definitely effective in fighting against sclerotinia rot and downy mildew. One measure was to remove yellow and diseased leaves to eliminate the transmitting media. In some places, thiophanate was sprayed after the yellow leaves were removed from the plants and the effect was better. According to the survey conducted by the agricultural office of Suichang County, removing yellow leaves once reduces the percentage of plants afflicted by sclerotinia rot from 72 percent to 43 percent. The percentage of diseased plants afflicted by sclerotinia rot after yellow leaves were removed and after spraying 1000 to 1 diluted thiophanate was 3 percent and the index of severity of disease was 2. In contrast, the percentage of diseased plants planted as controls was 54 percent and the index of severity of disease was 34. The other measure was to uproot the roots along with the plants at harvest. This not only prevents plants afflicted with sclerotinia rot from remaining in the field but also facilitates early planting of early rice. At the same time, by after-ripening, the seeds will fill fully. By finely harvesting and finely threshing, bumper yields and harvests are achieved.

Although the rape crop of 1979 achieved a bumper harvest and continued to surpass the records of the past, there were still 19 counties (cities) whose total yield was less than that of 1978, and the total yields of 22 counties did not reach the highest record of the past. There are still many weak links in production and the potential for increased yield is still not large. For example, problems with varieties exist. In some places, the ratio of indigenous rape varieties is still too large and the yields are not high or stable. In some commune brigades, the areas of seedbeds are insufficient, sowing is too dense and the quality of the seedlings cannot achieve the standard for healthy seedlings, thus affecting elevation of the yield. The fact that dryness affected the latter period of growth of rape did not arouse attention and thus the weight per thousand seeds was affected. In the future, as long as the experiences and lessons are summarized conscientiously, weak links are grasped well and the experience of high yields is actively popularized, greater surplus harvests will surely be achieved.

ZHEJIANG

BRIEFS

ZHEJIANG PREFECTURE COTTON PLANT--Jinhua Prefecture in Zhejiang will plant 175,000 mu of cotton this year, more than double of last year. [Hangzhou Zhejiang Provincial Service in Mandarin 0400 GMT 20 Feb 80 OW]

ZHEJIANG COUNTY GRAIN OUTPUT--In 1979 Shaoxing County, Zhejiang, registered a per-mu grain yield of 1,690 jin. Its total grain output topped 1978 by 204 million jin. The output of rapeseed, number of hogs delivered to the state and output value of commune- and brigade-run enterprises in 1979 doubled those of 1977. Per-capita income exceeded 150 yuan. [Hangzhou Zhejiang Provincial Service in Mandarin 1100 GMT 11 Feb 80 OW]

TAIZHOU STATE FARMS--Over the past year, 14 of Taizhou Prefecture's 20 state farms in Zhejiang have started to earn profits. The 20 state farm's industrial and sideline production output value has reached 5.43 million yuan, accounting for 40 percent of their total output value. [Hangzhou Zhejiang Provincial Service in Mandarin 0400 GMT 18 Feb 80 OW]

FIELD MANAGEMENT OF OVERWINTERING CROPS--Rural cadres and commune members in Zhejiang are strengthening field management of overwintering crops, including wheat, barley, rape and green manure. There are over 20 million mu of overwintering crops in the province. Two cold waves hit the province during late January and early February, and damaged some wheat, rape, and green manure crops in many areas. Thanks to the efforts of cadres and commune members, and through the application of more chemical fertilizers and by improving drainage in the fields, most of the crops are still growing well. [Beijing RENMIN RIBAO in Chinese 20 Feb 80 p 1]

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PUBLICATION OF PEASANTS NEWSPAPER--Trial publication of ZHONGGUO NONGMIN BAO (Chinese Peasants Newspaper) was started on 7 January 1980. Formal publication and distribution are scheduled to begin during the first 10 days of April. This paper is a comprehensive, popular newspaper for peasants. Its tasks are to popularize the party's rural policies and to encourage, educate and organize the peasantry to contribute their efforts to the modernization of agriculture. Two issues of this paper will be published every week, and each issue will have 8 pages. Four of these pages will carry political items and current events, and the other 4 pages will be devoted to scientific and technological items and literature and arts. The ZHONGGUO NONGMIN BAO News Agency's address is: 190 Wangfujing Street, Beijing. Readers may subscribe to this paper at local post offices. [Text] [Beijing RENMIN RIBAO in Chinese 3 Feb 80 p 3]

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